ICE AND Refrigeration

59th Annual Convention
NATIONAL ASSOCIATION of REFRIGERATED WAREHOUSES
San Francisco - February 7-10

PUBLISHED BY NICKERSON & COLLINS CO., CHICAGO - NEW YORK

58th YEAR ★ JANUARY, 1949

Increase refrigeration tonnage

Keep compressors and coils clean by lubricating with Texaco Capella Oils

YOU'LL get more tons of refrigeration for every dollar you spend — and you'll spend less time and money on maintenance — when you give your refrigerating compressors the effective lubrication of *Texaco Capella Oils*.

Texaco Capella Oils are highly refined, moisture-free and have very low pour tests. They do not react with refrigerants. They strongly resist formation of carbon, sludge and gum — keep compressors and coils *clean*. Thus, you get faster cooling, fewer cleanings and overhauls . . . maximum tonnage at minimum cost.

There are suitable viscosities of *Texaco Capella Oils* to assure peak efficiency and economy from compressors of every size and type. A Texaco Lubrication Engineer will gladly help you select the oil that best meets your needs.

Call the nearest of the more than 2300 Texaco Wholesale Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, N. Y.

TEXACO Capella Oils

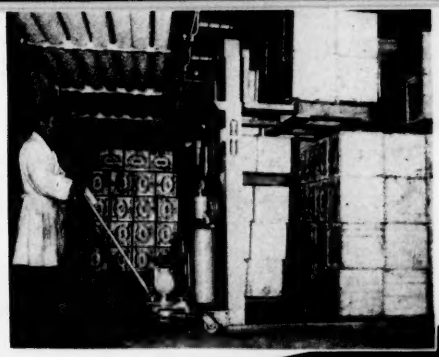
FOR ALL AIR CONDITIONING AND REFRIGERATING EQUIPMENT

TEXACO

Tune in . . . TEXACO STAR THEATRE presents MILTON BERLE every Wednesday night. METROPOLITAN OPERA broadcasts every Saturday afternoon.

ICE AND REFRIGERATION, Nickerson & Collins Co., Publishers, 433-435 N. Waller Ave., Chicago 44, Ill. Published monthly, Vol. 116, No. 1. January, 1949. Entered as second-class matter August 8, 1891, Chicago, Ill., under the Act of March 3, 1879. Additional entry at Beloit, Wis., April 20, 1948. Copyright 1949. Subscription in the U. S. $3.00 per year; other countries $4.00.

Another SUCCESSFUL INSTALLATION of MOTO-TRUCS



A ton of butter moved and stacked in one operation.

Our fleet of power trucks include the right equipment for every storage handling job.

QUICKER .. EASIER .. SAFER HANDLING OF PALLETS

Says

THE MANITOBA COLD STORAGE COMPANY, LTD.
Winnipeg, Manitoba

•

WRITE FOR BULLETIN No. 49
describing the complete line of MOTO-TRUCS

Move larger loads at greater speeds.

Egg cases are handled in quantities, with breakage reduced to absolute minimum.

Fast and easy loading and unloading of railroad freight cars.

The MOTO-TRUC Company
1953 E. 59th Street, Cleveland 3, Ohio
ORIGINATORS OF MOTORIZED HAND TRUCKS

FOR TOPS IN Quality USE

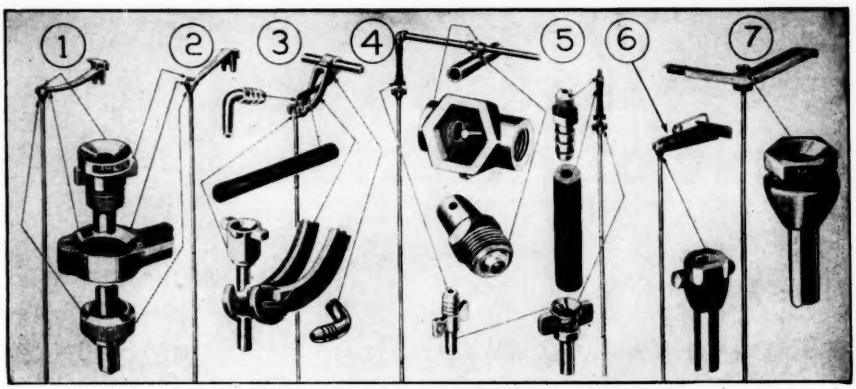
MARTOCELLO

EQUIPMENT

"Always Dependable"

Make CLEAR, CLEAN, QUALITY *Ice*

by using trouble-free, precision made and always interchangeable MARTOCELLO Clear Ice Making Systems and Supplies. It is most essential to the Ice Industry



THE ILLUSTRATION ABOVE SHOWS THE FOLLOWING CLEAR ICE MAKING SYSTEMS

1. MARTOCELLO SELF-CENTERING DROP TUBE BRACKET, Offset Form
2. MARTOCELLO SELF-CENTERING DROP TUBE BRACKET, Straight Form
3. MARTOCELLO SERIES DROP TUBE BRACKET
4. DOUBLE BRACKET SYSTEM ASSEMBLY
5. SERIES DROP TUBE ASSEMBLY
6. GALVANIZED STEEL TRUNNION TYPE BRACKET ASSEMBLY
7. GALVANIZED STEEL SADDLE BRACKET ASSEMBLY

Everything for the Ice Industry

Jos. A. Martocello & Co. — NOTHING BUT THE BEST — 229-231 NORTH 13th STREET PHILADELPHIA 7, PA.

"Serving the Ice Industry Since 1916" . . *"There is no Substitute for* MARTOCELLO QUALITY"

YES!

IT IS TRUE!

Lower Prices Are Back AT MARTOCELLO HEADQUARTERS for PARTS and SUPPLIES

Reduced Prices

MARTOCELLO GOES OUT IN FRONT TO KEEP PRICES DOWN AT THE LOWEST POSSIBLE LEVEL AND MAINTAIN THEM.

Quality

TO HAVE AN EFFICIENT ICE PLANT YOU MUST HAVE THE BEST EQUIPMENT. THEREFORE LOOK TO MARTOCELLO FOR QUALITY PLUS LOW COST.

Prompt Deliveries

FROM OUR EXTENSIVE STOCK ON AERATING EQUIPMENT AND SUPPLIES, WE CAN SHIP IMMEDIATELY ANY QUANTITY YOU REQUIRE.

Compare

LET US QUOTE YOU OR SEND YOUR ORDERS IN NOW. COMPARE QUALITY AND PRICE AND SEE WHY MARTOCELLO WINS OUT EVERY TIME.

Check Your Requirements

Air Agitating Systems and Supplies
Air Blowers and Compressors
Air Conditioning Spray Nozzles
Air Controlling Valves
Ammonia Gauges and Thermometers
Ammonia Charging Hose
Brine Pumps, Brine Circulators
Can Baskets and Can Fillers
Can Covers and Frame Work
Clear Ice Making Systems
Cold Storage Doors
Cooling Tower Nozzles
Condenser Water Distributors
Core Fillers, Suckers and Pumps
Dip Tanks and Can Dumps
Drop Tubes and Fittings
Filters and Filtering Material
Ice Cans, Can Fillers and Chutes
Ice Cubers and Ice Cube Cartons
Ice Cube Cutting Machines
Ice Picks, Tools and Scales
Pumps: Air, Brine and Water
Rubber Tubing and Hose
Sized Ice Machine, Ice Crushers
Strainers: Air and Water
Spray Nozzles and Spray Ponds
Valves and Fittings, Etc.

Jos. A. Martocello & Co.

229-231 NORTH 13th STREET
PHILADELPHIA 7, PA.

"Serving the Ice Industry Since 1916"... "There is no Substitute for MARTOCELLO QUALITY"

Argo Ice Co. Installation, Argo, Ill.

I've Got a Frigid-Vend—
Now I'm Really
Making Money!

NEW, COIN-OPERATED

FRIGID-VEND

SELLS ICE DAY AND NIGHT

Complete Ice Block Venders as Low as $495

Nights, days and holidays, FRIGID-VEND delivers block ice or bagged ice cubes direct from your ice storage room to your customer. The complete FRIGID-VEND unit is easily set up in your present ice storage room with coin box on the outside wall. By making use of your present ice storage room, FRIGID-VEND saves you hundreds of dollars in initial cost.

Fool Proof-Gravity Action

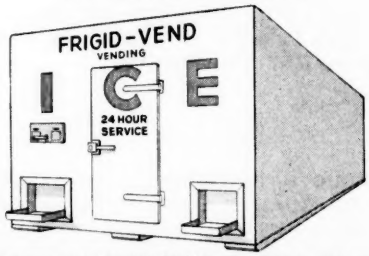
Your customer inserts a coin in the FRIGID-VEND slot, and *one* block of ice, or *one* bag of ice cubes is vended. Simple gravity action makes multiple deliveries impossible. A signal light above the coin slot indicates to the customer that ice is available, turns out automatically when all ice is sold.

Simple to Install and to Service

A complete FRIGID-VEND unit can be set up in a few days. Only one electrical connection is required for the ½ h.p. motor that powers the vending operation and for the 25-watt signal bulb. Because of the simple gravity action, there are no complicated parts to service. The switches that control vending of ice are simple, insuring positive operation. There are no magnets or mercury bulbs involved. In fact, keeping the FRIGID-VEND filled with ice is practically the only servicing required.

FIVE SIZES INCLUDING BAG VENDERS AVAILABLE

Write today for full information



Equipped with 1½ H.P. Frigidaire Refrigeration Unit and Dole Vacuum Cold Plate Evaporators.

THERMO CUBER

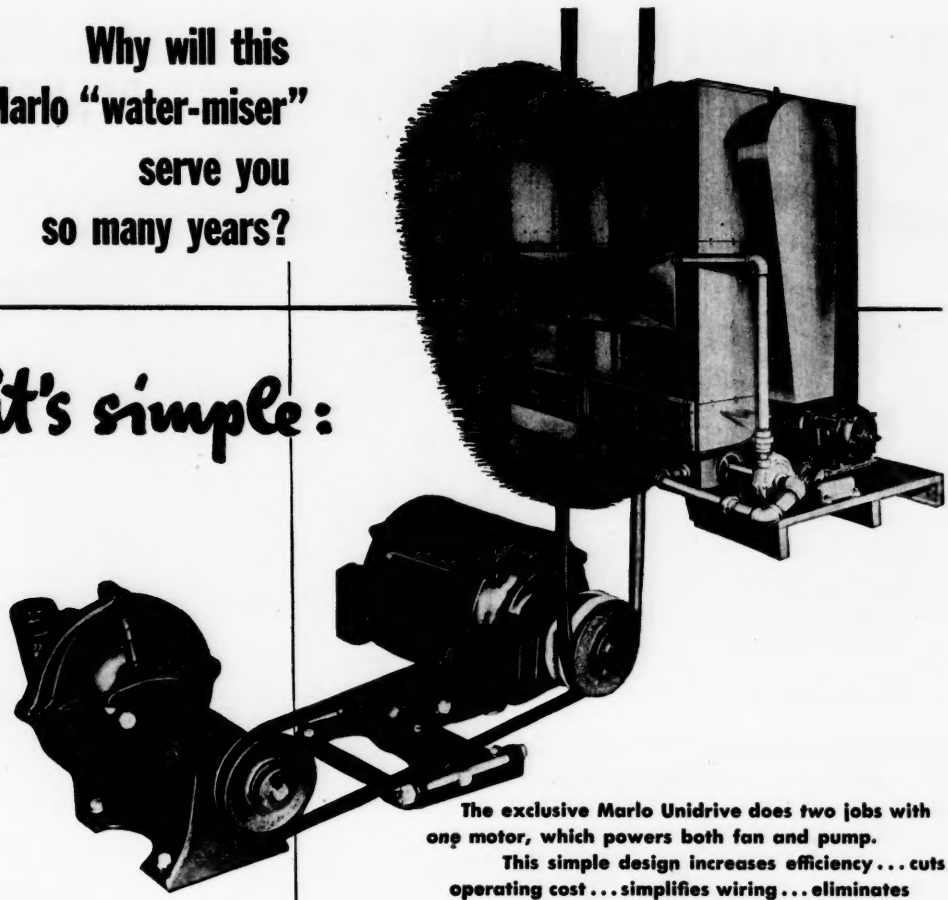
Complete Automatic Ice Vending Refrigerated Stations Now Available.

THERMO CUBER CO., Inc.

2120-24 N. SOUTHPORT AVE.
CHICAGO 14, ILLINOIS

Why will this Marlo "water-miser" serve you so many years?

it's simple:



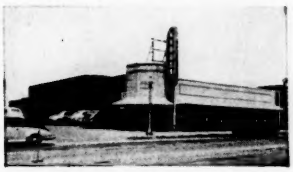
The exclusive Marlo Unidrive does two jobs with one motor, which powers both fan and pump.

This simple design increases efficiency... cuts operating cost... simplifies wiring... eliminates special extended-shaft motors and pumps... permits easy field replacement.

That's just one typical reason why many Marlo Evaporative Condensers and Cooling Towers are still faithfully saving up to 95% of normal water consumption and cost... after **10 years** of daily service.

For **lasting** economy specify...

***MARLO COOLING TOWERS AND EVAPORATIVE CONDENSERS**



Kroger Supermarket in St. Louis uses a CT-20 twenty ton Cooling Tower to handle condensing units for entire refrigeration system. Kroger is using these units in new and remodeled supermarkets throughout the Midwest Territory.

MARLO • HEAT TRANSFER
Since 1925

MARLO COIL CO. / ST. LOUIS 10, MO.

DROP FORGED ST[illegible]MI-STEEL VALVES FOR ICE MAK[illegible] AND REFRIG[illegible]TING PLANTS!

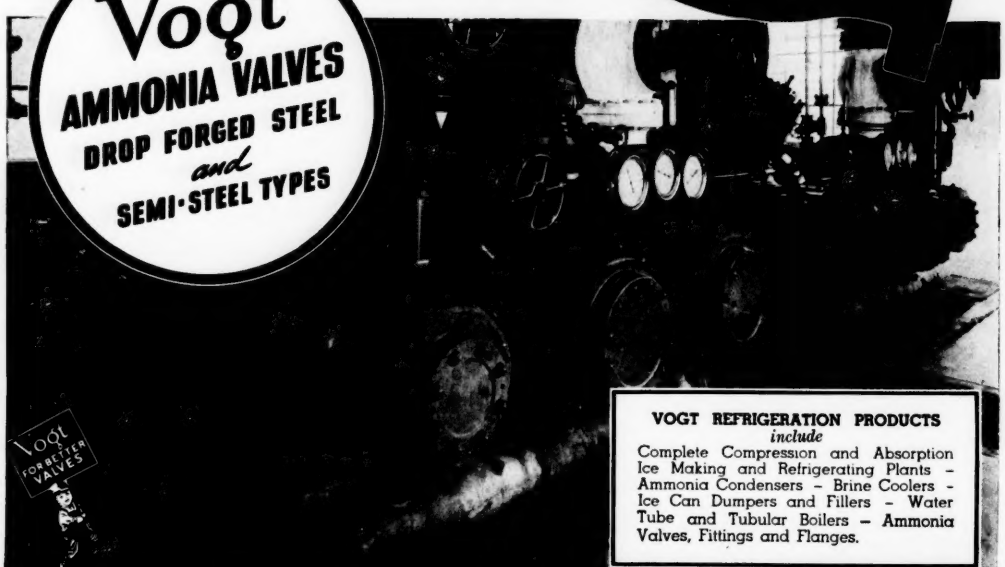
Vogt builds a complete line of ammonia valves for the positive control of refrigerants in ice making and refrigerating plants.
Screw end valve bodies are fabricated from solid steel drop forgings. Flanged bodies, with tongue and groove facings, are cast from a high grade semi-steel for maximum strength and tightness. All companion flanges are drop forged steel.

Catalogue AF-2 covers our complete line of Ammonia Valves, Fittings and Flanges.

(Right) **Flanged Globe and Angle Valves from 1/4" to [illegible] inclusive.**

(Above) **Screw End Globe and Angle Valves from 1/4" to 2" inclusive.**

Vogt
AMMONIA VALVES
DROP FORGED STEEL
and
SEMI-STEEL TYPES



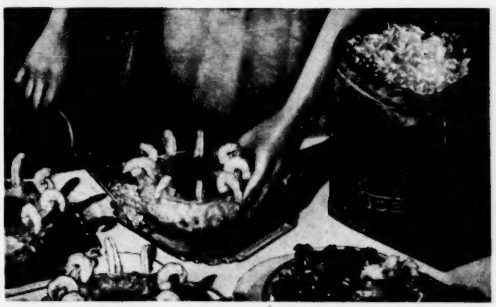
VOGT REFRIGERATION PRODUCTS
include
Complete Compression and Absorption Ice Making and Refrigerating Plants – Ammonia Condensers – Brine Coolers – Ice Can Dumpers and Fillers – Water Tube and Tubular Boilers – Ammonia Valves, Fittings and Flanges.

HENRY VOGT MACHINE CO., Inc., LOUISVILLE, KY. *New York - Philadelphia - Cleveland Cincinnati - St. Louis - Chicago - Dallas*

"My Customers do their own icing now —and use more ice"

RETARDS MELTING... You know what a good insulator paper is... it's even used in home insulation. Union Paper Ice Bags retard melting, reduce losses through shrinkage.

INCREASES CONSUMPTION... With these light-weight, easy-to-handle units, customers do their own icing... and ice more often. And you'll find *new* users of processed ice among people who won't be bothered with bulky containers which must be returned.



COMPLETELY SANITARY... Union's *One-Trip* Paper Ice Bags come to you absolutely *clean*... and carry your ice to your customer the same way. With Union's bags your ice is always packed and delivered in a fresh, new container.

TRADE MARK UNION

ONE TRIP

UNION PAPER ICE BAGS

A PRODUCT OF THE

UNION BAG & PAPER CORPORATION

Woolworth Bldg., New York 7, N. Y.

Bags of Kraft, Transparent Films, Waxed Paper, Glassine Laminated

WET-STRENGTH PAPER has tremendous strength even when soaking wet ... thanks to a water repellent resin that binds the fibres firmly together.

Now! the Most Powerful Sales Features of them all!

"Optional Conveniences"

... PLUS new shelves with "Feature Front" trim styling!

with the NEW

Vitalaire

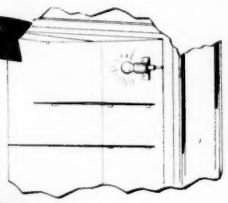
ICE REFRIGERATORS

Here is the sales ammunition you'll need for increased volume and profits in '49! Just think what Vitalaire's new "Optional Conveniences" mean to you; first, they mean a big edge over your usual competition; second, they give you sales points equal to anything your mechanical competition offers! And, remember—Vitalaires, now as always, are fully equipped steel refrigerators—complete to the last, *wanted* detail! See them, place your order *now* for PROMPT DELIVERY on all models!

INTERIOR LIGHTING

optional!

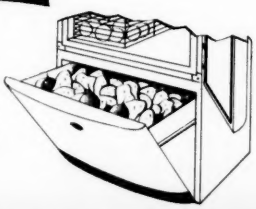
A brand new, grand view feature that makes a crowd-stopper of your Vitalaire display! Interior light operates automatically. Optional on Models VJ5 and VJ6 only.

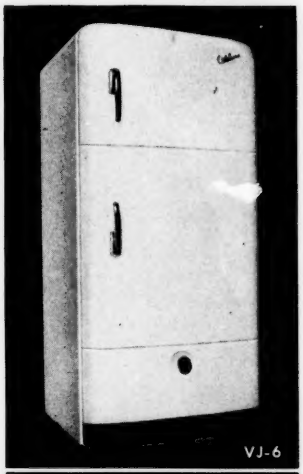


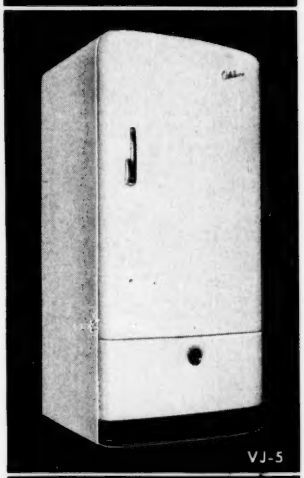
VEGETABLE BIN

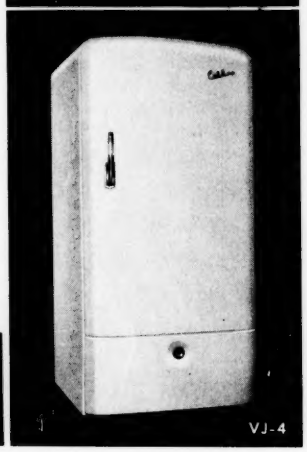
optional!

Another feature the housewife has been waiting for... now yours to offer with Vitalaire... the *complete* refrigerator! Vegetable bins are important necessities which will help increase your unit sale. Optional on Models VJ5 and VJ6.







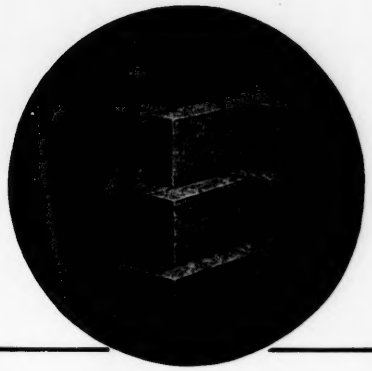


ICE COOLING APPLIANCE CORP.

PLANT: Morrison, Illinois OFFICES: 33 S. Clark St., Chicago 3, Illinois

FOR STRUCTURAL STRENGTH

Corkboard is the Choice



Section of cold room wall showing layers of Mundet Corkboard overlapped to provide barrier against heat and moisture. All joints are vapor-sealed.

The compressive qualities and resiliency of corkboard are inherent in the cellular structure of the material. Because of its strength, corkboard is an integral part of cold room construction . . . resistant to stress and vibration . . . providing a dependable barrier against heat and moisture.

This strength factor is only one of the time-proved benefits that lead to the selection of Mundet Corkboard.

The nation's largest users of refrigeration choose Mundet Corkboard for these money-saving advantages:

STRUCTURAL STABILITY The cellular structure of Mundet Corkboard maintains its shape and characteristics under rigorous conditions of service.

NON-ABSORBENCE Mundet Corkboard has no capillary attraction. This nature-made quality avoids absorption of dampness and odors. There is no swelling or loss of insulating value from moisture infiltration.

LOW CONDUCTIVITY Mundet Corkboard provides the most efficient barrier to heat transfer due to its internal cellular structure of sealed dead-air spaces.

EASE OF INSTALLATION Mundet Corkboard is light in weight despite its strength. It cuts easily, readily holds nails or skewers; bonds with cement, asphalt or paint.

LONG-LIFE There is only one way to figure insulation cost. That is the over-all 'life-expectancy' of the material. Here, again, Corkboard is the choice, with thousands of installations to prove its durable service.

●

For factual reference, write for copy of Mundet Cork Manual. In convenient filing size; contains cork specification data. Mundet Cork Corporation, Insulation Division, 7101 Tonnelle Avenue, North Bergen, New Jersey.

Mundet district offices are located in these cities:

ATLANTA
339-41 Elizabeth Street, N.E.

BOSTON
57 Regent St., North Cambridge 40

CHICAGO 16
2601 Cottage Grove Avenue

CINCINNATI 2
427 West 4th Street

DALLAS 1
505 Southland Life Annex

DETROIT 21
14401 Prairie Street

HOUSTON 1
Commerce and Palmer Streets

JACKSONVILLE 6, FLA.
800 E. Bey St.

KANSAS CITY 7, MO.
1428 St. Louis Avenue

LOS ANGELES
(Maywood)
6116 Walker Avenue

NEW ORLEANS 16
315-25 N. Front Street

PHILADELPHIA 39
856 N. 48th Street

ST. LOUIS 4
2415 South Third Street

SAN FRANCISCO 7
440 Brannan Street

In Canada:
Mundet Cork & Insulation, Ltd.
35 Booth Avenue, Toronto

Write us for name of our nearest representative if there is no Mundet office in your city.

MUNDET
CORK INSULATION

CORKBOARD · CORK PIPE COVERING

"BUTCHER BOY" is the preferred cold storage door of the industry, because it has ALWAYS met every conceivable challenge of hard usage. The strong, massive construction of Butcher Boy doors is the result of "controlled quality" production — a guarantee that they will meet every rigid test of required performance.

Time tested heavy duty hardware applications, PLUS prime insulation, PLUS 100% Douglas Fir Construction is a resultant product equalled by none — BUTCHER BOY. Write for free bulletins today.

VESTIBULE-TYPE TRACK DOOR

BUTCHER BOY COLD STORAGE DOOR CO.

170 N. SANGAMON ST., CHICAGO 7, U. S. A.

TIME IS RUNNING OUT

Up-to-the-minute equipment will mean more profit to you. LABOR COSTS are every ice manufacturer's heaviest burden and the greatest source of loss. Every time an old or inefficient machine needs repair, you lose money.

A modern Perfection-made Ice Scoring Machine automatically insures you against such loss.

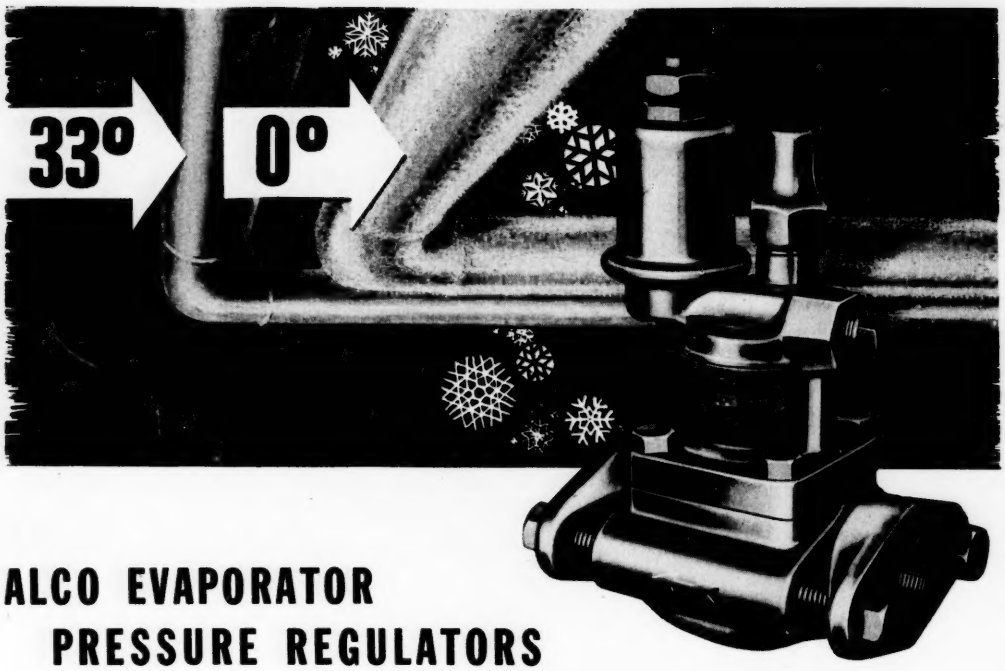
Let us figure with you NOW on the latest developments in scoring ice . . . a scoring machine to exactly fit your plant. Get ready NOW for the new ice season, which is right at hand. Liberal trade-in on your old equipment.

AMPLE STOCKS OF MAINTENANCE PARTS ON HAND FOR IMMEDIATE SHIPMENT.

Perfection

ICE SCORING MACHINE COMPANY

Phone 3-1258
P.O. Box 2140
FORT WORTH, TEXAS



ALCO EVAPORATOR PRESSURE REGULATORS

for wide-range multi-temperature control

You can rely on Alco EPR Valves to maintain accurately a minimum suction pressure in cold storage rooms where humidity must be maintained or there is danger of freezing the produce. By preventing "flood-back" and utilizing the lowest practical evaporator pressure, they get maximum capacity from cold storage and ice plant refrigeration systems.

ALCO

AMMONIA CONTROLS

Delicately balanced – will operate on just 2 pounds pressure differential.

Rugged, corrosion-proof, simple come-apart construction for long life and easy servicing without removing from line.

3½ to 200 tons nominal capacity. Write for Ammonia Control Bulletins for complete details.

Designers and Manufacturers of Thermostatic Expansion Valves; Evaporator Pressure Regulators; Solenoid Valves; Float Valves; Float Switches.

ALCO VALVE CO.

835 KINGSLAND AVE. • ST. LOUIS 5, MO.

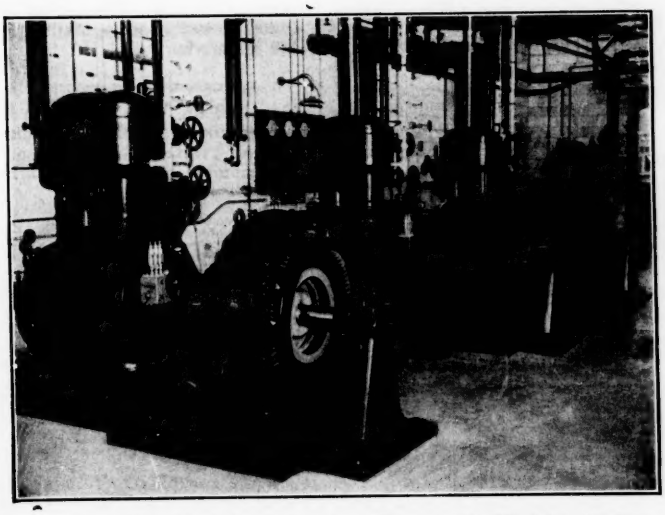
Right: Iceing a Shrimp Trawler at Biloxi.

Below: Jumbo Shrimp Fresh from the Water.

JUMBO SHRIMP — 50,000 LB. A DAY — QUICK-FROZEN AT BILOXI, MISS.

Nearly five hundred Mississippi fishing boats are given a dual service by the Biloxi Freezing Company. Here, in the heart of the famous Gulf Coast resort, the boats are each loaded with from 6 to 18 tons of ice before sailing. Their freshly caught shrimp and seafoods are then quick-frozen at the same busy plant, now in its second season.

This is another example of what Frick ice-making, refrigerating and air conditioning equipment can mean to new industries—and to old. Let us quote on your cooling needs.



Four of the Five Frick Compressors. One a Booster, at the Biloxi Freezing Co.

FRICK
BRANCH OFFICES

Atlanta 3, Ga.
Boston 20, Mass.
Charlotte 2, N. C.
Cincinnati 2, Ohio
Dallas 1, Texas
Kansas City 6, Mo.
Los Angeles 14, Calif.
Memphis 3, Tenn.
New Orleans 12, La.
New York City 17
Oklahoma City 3, Okla.
Palatka, Florida
Philadelphia 7, Penna.
Pittsburgh 22, Penna.
Saint Louis 2, Mo.
Washington 5, D. C.

FRICK CO.

WEST POINT *repipes its rink with* BYERS WROUGHT IRON PIPE

Over a period of years, the skating rink at the United States Military Academy had corrosion troubles. Leaks were causing soft spots in the ice, and making frequent replacements necessary. It was recently decided to completely replace the cooling coils, using a corrosion-resistant material. Byers Wrought Iron pipe was installed throughout.

NEW FLOOR SLAB POURED

Removal of the old pipe would have been a difficult and costly job, and so the new wrought iron coils were laid on the surface of the concrete, and a new floor slab poured. The old pipe was cut off from the headers, and the new pipe connected.

CERTIFIED BY SERVICE

The choice of wrought iron for this highly corrosive service follows sound engineering practice. In one of the country's largest rinks, low-first-cost pipe was used in the original installation, and failures appeared in only three years. In the next five years, almost 20% of the pipe was replaced, and it was apparent that a complete overhaul was essential. The entire floor was therefore rebuilt . . . and Byers Wrought Iron pipe was used, which is still serving after 14 years.

In another large rink, 21 miles of wrought iron pipe was installed when the rink was constructed. The rink was rebuilt after 26 years of continuous service—and over 20 miles of the pipe was reused.

"BUILT-IN" CORROSION RESISTANCE

The superior performance of wrought iron comes from its unique composition and structure. Tiny fibers of glass-like silicate slag, threaded through the body of high-purity iron, halt and "detour" corrosive attack, and so discourage pitting. The fibers also anchor the initial protective scale, that shields the underlying metal.

INFORMATION ON REQUEST

Our bulletin, "Wrought Iron in Refrigeration and Air Conditioning Systems", will give you information on a number of rink jobs. Ask for a copy.

A. M. Byers Co., Pittsburgh, Pa. Established 1864. Boston, New York, Philadelphia, Washington, Atlanta, Chicago, St. Louis, Houston, Salt Lake City, Seattle, San Francisco. Export Division: New York, N.Y.

CORROSION COSTS YOU MORE THAN WROUGHT IRON

J. F. NICKERSON, Founder

Published First of Each Month by

NICKERSON & COLLINS CO.

433 N. Waller Ave., Chicago 44, Ill.

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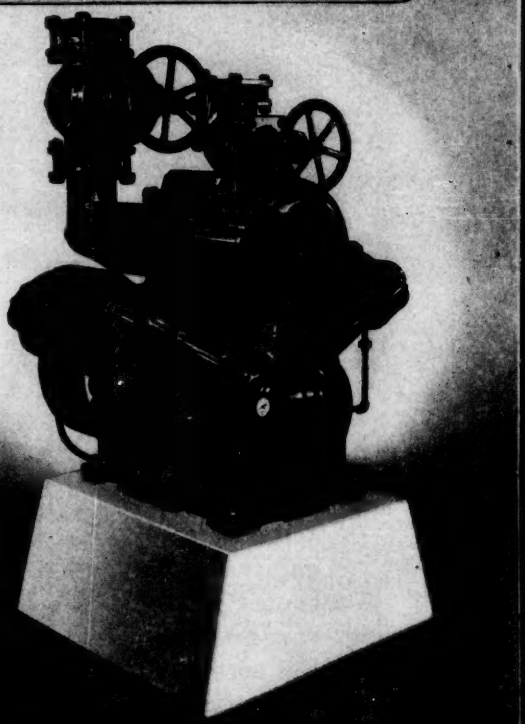
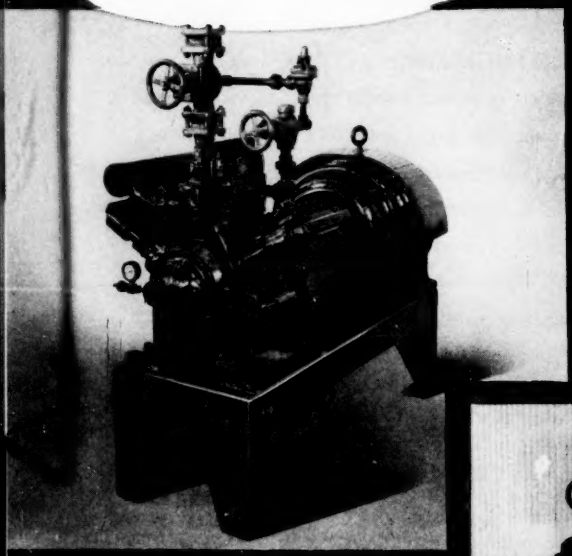
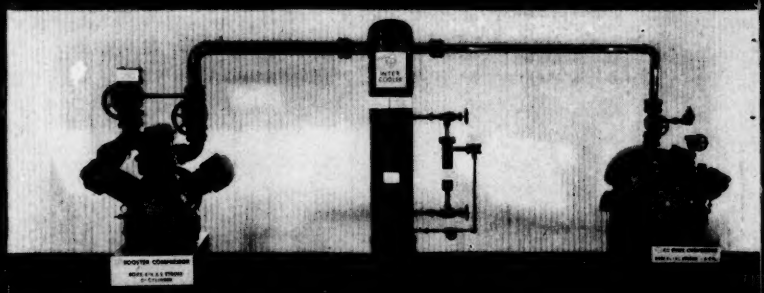
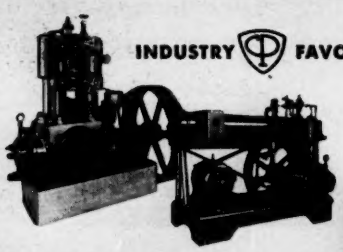






INDUSTRY FAVORITES



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IN THIS ISSUE —

The lead article in this issue, page 21, presents a brief survey of the early days of refrigerated warehousing, from the time when salt and ice was used as a refrigerant. It will be interesting, we believe, to the old-timers as well as the younger members of the industry.

———⊕———

In accordance with the times most industries are undergoing changes in their plants and methods. So is the refrigerated warehousing industry. New materials are being used in construction and equipment and new applications are being made of old materials. New designs and methods have also come into the picture to meet the numerous challenges of the present day. The article on page 32 reviews these trends in refrigerated warehouse plants and methods.

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The Refrigeration Research Foundation, its accomplishments and future plans, is the subject of two articles starting on page 41 by Vallee O. Appel, president of the Refrigeration Research Foundation, and on page 42 by Arthur N. Otis, vice-president of the Association of Refrigerated Warehouses. They are followed by other articles telling of the value of research from the standpoint of the meat and poultry industries.

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The leading exponent of improved inter-industry relations between Refrigerated Warehousemen and the industries they serve is Harlan J. Nissen of Los Angeles, Calif. Mr. Nissen, who has been president of the National Association of Refrigerated Warehouses and is now president of the A.W.A., brings the industry up-to-date on this important subject in the article on page 46.

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Better interest in the job, less personal injuries, improved care and handling of the product—all these and more have been demonstrated to be the good results of training and educating employees. How the job was done in a cold storage and allied organization is described in the article on page 47.

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The use of refrigerated foods by restaurants is the subject of an interesting article on page 49 by Col. Paul Logan, of the National Restaurant Association. A companion contribution on the viewpoint of a home economist is furnished on page 50 by Miss Mary Barber, director of Home Economics, Kellogg Co., Battle Creek, Mich.

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The liability of warehousemen for loss or damage to goods in storage and protective forms of warehouse receipts is an important subject in the refrigerated warehousing industry. It is discussed in an informative article on page 51. Another subject in which warehousemen are interested is the proposed revision of all commercial law and that is discussed in summary form also on page 51.

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The newest committee of the National Association of Refrigerated Warehouses is the Pacer Committee. Less than a year old, under the direction of Garth Shoemaker, it has swung into action on many things designed to promote the prosperity of the industry. The Why and What and How of the "Pacers" is told in the article on page 54.

How a Produce Terminal Operates

An attractive four-color picture showing how fruits and vegetables are kept fresh in transition from growing fields to the food store is reproduced on page 25. Prepared fir consumer advertising, it provides good understanding of this important subject.

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NARW Convention Program

A preview of the annual convention program lists the various activities to be provided for the information and entertainment of the members and guests attending the San Francisco meeting of the National Association of Refrigerated Warehousemen to be held February 7-10. The official program is given in the article on page 55.

———⊕———

Refrigerated Warehousing Industry Review

Reports from leading warehousemen review conditions in the industry during 1948 and point to tendencies for 1949. Space occupancy was down, in most cases, but not alarmingly so, and some revival is expected for 1949. These reports are reviewed in the article starting on page 57.

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Concealed Coils Cool Ice and Date Storage

Refrigerating coils take up space and require defrosting. Where these coils do nothing but offset heat leakage they might as well be inside the roof, reasoned one California builder. How the coils were built in the roof and other features of a new storage building are given on page 63. We have cold wall coils in home refrigerators and home freezers. Now we have a cold roof storage of considerable size. It is in the Imperial Valley where temperatures are high.

———⊕———

Review of the Ice Industry

From views of ice distributors in representative sections of the country has been compiled a review of the industry for 1948 and something on the outlook for 1949. Outstanding were decreased tonnages and a continued trend upward of processed ice sales. The report starts on page 67.

———⊕———

Good Condenser Operation

Although a refrigerant condenser is a relatively simple piece of plant equipment much of the efficiency of the plant depends upon its design and the care with which it is operated. The factors in good condenser operation are detailed on page 76 by Leon Buehler and he includes data and charts of value in checking condenser operation.

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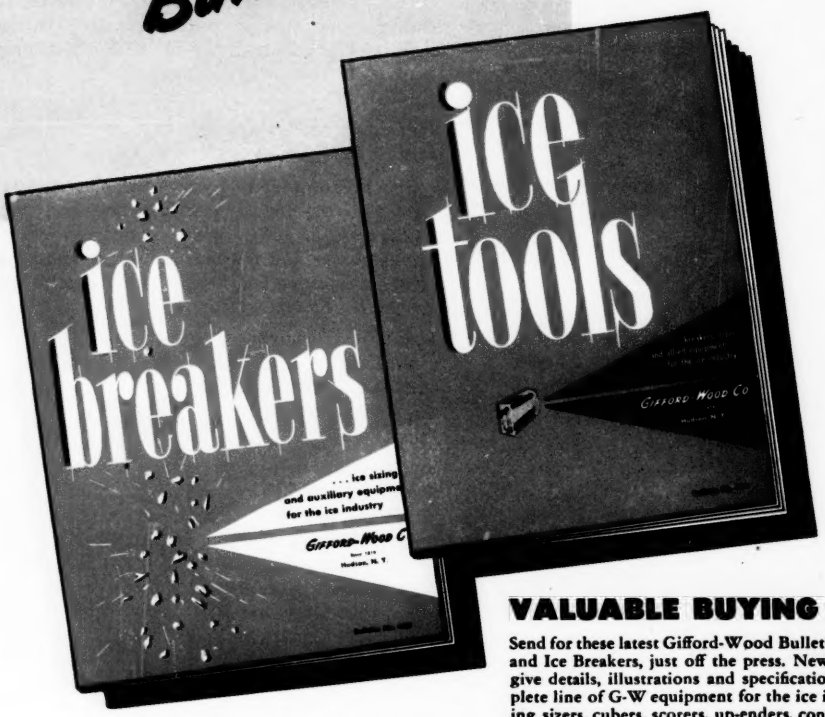

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1891 – Pre-Convention Issue of the NARW – 1949

THIS is a special pre-convention issue for the American Warehousemen's Association and the National Association of Refrigerated Warehouses which will hold their 58th annual meeting in San Francisco, February 7-10, 1949. This is also the 58th anniversary of ICE AND REFRIGERATION. In this special issue we present a series of historical sketches of the refrigerated warehousing industry from the early days which we believe will interest the old timers as well as many whose memories do not go back so far. Other articles of special interest are from subsidiary industries whose members are customers of refrigerated warehouses. We offer this as a distinct service to the refrigerated warehousing industry which ICE AND REFRIGERATION has served continuously since the Early days.—THE EDITORS.

The Refrigerated Warehousing Industry — From Early Days to 1949

By Edgar R. Curry
Managing Editor ICE AND REFRIGERATION

A RECENT issue of Time Magazine recalls that "woolly mammoths had been found frozen in Siberia. Their healthy appearance and the good qualities of their flesh indicated . . . that they must have been 'quick-frozen,' like Birdseye peas."

Thus we have "documentary" evidence that the roots of the Rerfigerated Warehousing Industry as we know it today extends deep into antiquity, ages before recorded history of man. It was nature's own cold storage, from which has developed the huge business which now provides mankind with perishable foods the year round.

There may be additional archaeological records that would serve as a guide to further research on the cold storage methods of antiquity but for this article it would have no practical purpose. So we will leave the mammoths of unknown eons ago and move forward to the time of man-made refrigerated warehousing; to the time when mankind's foods are kept under controlled temperatures and humidities, regardless of outside climatic conditions.

The early applications of cold to foods were quite crude and for the mere purpose of preservation to prevent total loss. Fish and meats were put in cold rooms or in pans on pipe shelves and allowed to freeze. Fish were frequently held fresh until they were, to say the least, stale, and, to avoid loss, were put in storage and frozen as a last resort. When the market was glutted with an excess of fish, they were put into storage to be held for better prices later on—usually in winter when fishing was less productive and the demand stronger.

AUTHOR'S NOTE: This article is not offered as a complete picture of the refrigerated warehousing industry. Although the material is available for such a historical sketch, the time required for such a major job of research is not. Rather it is intended as a series of quick sketches tracing to their roots some of the present day problems, customs and activities. Its sources were early issues of ICE AND REFRIGERATION, the A.W.A. Year Book, historical sketches issued by various refrigerated warehouse companies and letters from a few of the older members of the trade who delved into their memories for facts worthy of recording.—E.R.C.

The industry had its beginnings when natural ice was used as the refrigerant. It was greatly limited at that time by the range of temperatures which could thus be obtained and the equipment which was at that time available.

It was in 1865, according to D. B. Beemer, an early cold storage operator and a frequent contributor to ICE AND REFRIGERATION during its early days that the first commercial cold storage business was established.

The first cold storage room in this country, he says, was constructed and owned by A. &. E. Robins, then large

Historical Highlights

The first cold storage warehouse in the United States was opened in 1865, in New York.

The first refrigerator car was built in 1868.

The first shipment of frozen mutton from New Zealand to England was made in 1879.

Prior to 1890 cold storage warehousing was limited and natural ice was the refrigerant. Salt was added if temperatures lower than 45 F. were required.

Mechanical refrigeration came into use in the 1890's, and marked the beginning of a new era.

Originally butter, cheese, eggs, fish, fruit and nuts were the only commodities stored in quantity.

ICE AND REFRIGERATION was established in 1891, the first issue appearing July 1 of that year.

The American Warehousemen's Association was organized in Chicago in October, 1891.

Cold storage was big news at the Chicago World's Fair in 1893. A new plant had been built there but it was destroyed by fire with large loss of life and property.

Warehouse reporting of holdings of butter and eggs was begun by 10 warehousemen in 1901, and within a few years this task was assumed by the U. S. Dept. of Agriculture.

The United States Department of Agriculture in 1901 obtained an appropriation of $1,000 to study the effect of cold storage upon fruits.

dealers in poultry and game in Fulton Market, New York City. "Their system was a combination of experimental plans and devices, invented and put in operation by the members of this firm, the result of the necessity apparent in their business for some such means for carrying their stock through bad weather and a full market, and to carry stock bought at low prices during gluts in the market, which offered opportunities for speculation.

"Under such circumstances and pressure they, as early as 1865, I think, started this room of theirs in an experimental way, and continued to add apparatus to it and make alterations in it suggested by their experience until finally they attained such power in it that they were able to freeze up stock solidly and carry the same for an indefinite length of time."

In Other Days —

Early Insulation Methods

A LARGE warehouse of early days employing insulation of a type still used was described in the February 1897 issue of ICE AND REFRIGERATION. This plant of the Merchant's Freezing and Cold Storage Co., Providence, R. I. also typified the heavy construction common to that period. The building was erected upon 3,000 wood piles with concrete caps, on which a heavy block granite foundation was erected. Lower level brick walls were 36 to 40 inches thick although this thickness was reduced in the upper stories.

The wall insulation was built up with a number of courses of wood and paper with air spaces between but in the spaces formed by 4 in. studding the builders filled mineral wool. In locations where moisture infiltration was considered more likely, granulated cork was used. Piping not exposed to view was insulated by boxing it in and filling around it with granulated cork. Engine room illustrations show cold pipes covered with a blanket type of fiber insulation finished with heavy insulating paper and secured with closely spaced wire ties.

The architecture of the building was not so ornate as many buildings of the nineties. The exterior view of it was taken from the article mentioned.

Another cold storage process in operation about 1878 is described by a writer in the New York News, reprinted in the June, 1896, issue of ICE AND REFRIGERATION.

This system was described as crude and imperfect, and a most surprising mistake in construction delayed its success for a considerable time. The cellar was chilled with ice and salt to the lowest possible degree, and the cold air was driven up to the floors above through pipes by the use of powerful Sturtevant blowers. It was found to be perfectly feasible to chill the warehouse, but exceedingly difficult to keep the temperature steady at any desired point. The mistake which, curiously enough, was not discovered for a considerable time, was in chilling the cellar instead of the top story. The warm air naturally rose to the top, and the cold air, being the heavier, fell by its own weight, so that there was a constant game of battledore and shuttlecock going on in the building.

Another item in the problem was only decided after a series of careful experiments. It was not known, naturally enough, what temperature was the best for the preservation of different foods. For example, the people who stored butter there insisted that it should be kept at a temperature from 50 to 55 F. If they had eggs to keep, they would not have them kept colder than 45 F. The general impression then was that it was dangerous to have things too cold.

Mr. Beemer was an enthusiastic cold storage man and a prolific and entertaining writer, not adverse to publicizing some tricks of the trade of that day and telling revealing anecdotes about his associates in the trade. For many issues he continued his articles in ICE AND REFRIGERATION which furnish a wealth of information about those early days.

Early Days

For instance in the second issue (August 1891) he describes a merchandising coup. He relates that he built his first refrigerated room on South Water St., Chicago, before the big fire. He admits that he smuggled or poached his plan and ideas from a view of a freezer used by Robins, the Fulton Market man in New York in 1869. The first thing he did was to freeze it full of wild pigeons bought at 50 cents a dozen off the market in Chicago. When a rise came in the New York market he began shipping "soft" birds off the street in barrels with a core of frozen birds instead of a chunk of ice. By the time the birds got to New York the frost was out of the frozen ones and all sold for fresh killed. He cleared $1,000 in ten days in this way before the market broke again.

The next year (1870) he became interested in a cold plant in operation in New York which involved the use of a steam engine in connection with a "blast blower," which was connected with a series of air-tight rooms by air pipes with "cut-off" attachments to each room. The air was sucked through these pipes from any given room that had the valve open at the time—connection with the others being shut off for the time being—and forced out from the "blower" through another pipe leading into and through a set of air pipes immersed in an upright, metal-lined, wooden tank filled with a mass of ice and salt, and back into the room again through another pipe. In this way a circuit was established—the air, drawn from the room by one pipe, returned by the other after its passage through the tank of ice and salt.

It seemed a practical thing, he says, and so he went back to Wisconsin and built rooms in a warehouse there to hold poultry frozen until ready to ship it to eastern markets. He had a poultry ranch there covering three acres of ground. He killed and froze up six car loads that season in December and held them until February, when he loaded them in refrigerator cars and went to New York and stored them and later sold them at a good profit.

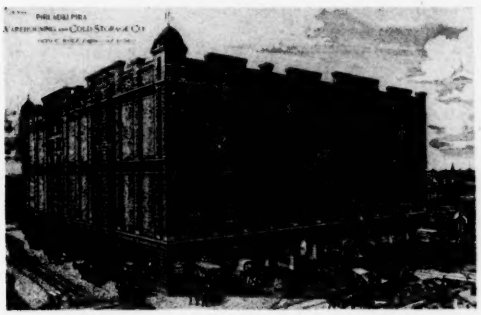
Another interesting anecdote is told by Mr. Beemer in the March, 1892, issue of a banker in Independence, Iowa, who also shipped produce and prairie chickens. In 1863 he offered a speculative "curbstone operator" a contract for $1.50 per dozen for what chickens he could bring in. This operator was so successful that soon the banker's shipping room, 16 x 60 ft., was filled and he had to acquire additional space. In the meantime eastern markets became glutted and shipments were re-routed to Liverpool. But still the birds came in. Finally the banker refused to receive any more and the case was submitted to arbritration

in which the contract was cancelled, but by that time spring opened and the birds thawed out and the banker had lost $10,000 on the deal. He adds the very interesting comment that this happened before the days of cold storage and that if such storage had been available, it would have saved this man and many others disastrous losses.

This series of articles by Mr. Beemer continued for several months, covering his experiences in shipping perishables in refrigerator cars, storage of eggs, butter, apples, effects of lemons on eggs in storage, storage and marketing of turkeys and other phases of the new and growing cold storage industry.

Early Refrigerated Warehouses

A strictly modern refrigerated warehouse for that day was described as just having been completed in the July, 1891, issue of ICE AND REFRIGERATION. This was the main building of the Philadelphia Warehousing and Cold Storage Co., "an imposing structure of massive design, eight stories in height, having a frontage on both Delaware Avenue and Beach Street of 125 ft., a depth of 150 ft. and a total height of 120 ft."



Reproduction of a full page picture in the July 1891 (Vol. 1 No. 1) issue of ICE AND REFRIGERATION showing the main building of the Philadelphia Warehousing and Cold Storage Co., "an imposing structure of massive design eight stories in height, having a frontage on both Delaware Avenue and Beach Street of 125 ft., a depth of 150 ft., and a total height of 120 ft.

In a second structure was located the refrigerating machinery, condensers, boilers, pumps, distilling apparatus and other machinery to complete the refrigerating plant, as well as a duplicate electrical light and power plant for 1,200 incandescent and arc lights. This building was 65 x 140 ft., two stories high, with ventilator tower.

The main building was used as a storage house and six floors containing 973,000 cu. ft. of space, were prepared for the reception and preservation of perishables and other goods best preserved at low temperatures. On the first floor were the offices, receiving platforms, four hydraulic elevators for the reception and delivery of goods, four freezing tanks for the daily production of fifty tons of ice; the ice storage house, and inclosed in a brick shaft, the fireproof staircase leading to all the upper floors. Six floors were partitioned off into ten storage rooms each, having central passages, and so designed that each was accessible to the elevators through an outside chamber or air lock. The eighth floor was used for the general storage of goods not requiring refrigeration, but could be readily converted into cold storage rooms, like the floors below. The building was built internally of wood in "slow burning construction," the exterior insulations being brick walls with air spaces.

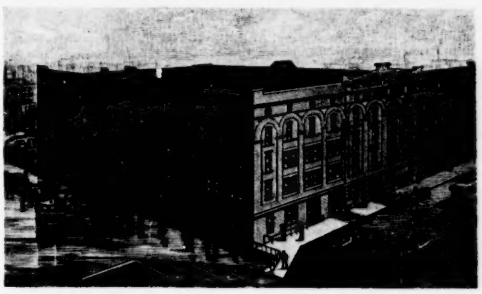
In the machine house were two, 125 tons each, refrigerating machines, made by the Consolidated Ice Machine Co., of Chicago. These machines had an efficiency equivalent to the cooling work performed by the melting of 250 tons of ice per twenty-four hours. They consisted of four powerful vertical ammonia compressors driven by two horizontal Corliss engines, developing 150 hp to which steam was supplied by five horizontal return tubular boilers, aggregating 550 hp and made by the Kensington Boiler Works, of Philadelphia.

The distilling apparatus was made by the De La Vergne Refrigerating Machine Co. A tunnel, twelve feet wide and eight feet high, connected the two buildings, through which all the pipes, electric wires, etc., were run. Two powerful dynamos run by independent Armington & Sims engines, constituted duplicate electric lighting plants. The system was erected by the United States Electric Light Co., and over 60,000 ft. of wiring was required, making one of the most complete electric lighting plants erected by this company. The freezing tanks of the ice plant occupied a space 116 x 46 ft. on the first floor of the main building, and had a production capacity of fifty tons of ice per day in blocks of 300 pounds each.

This plant was planned and built under the direction of Otto C. Wolf of Philadelphia, a refrigeration specialist.

Milwaukee Cold Storage

Another pioneer cold storage warehouse was the one built in 1893 by the Milwaukee Cold Storage Co., Milwaukee, Wis., 50 to 62 Read St., described as the largest in the State of Wisconsin. It was five stories high with basement with a frontage of 145 ft. on Read St. and a depth of 140 ft. on the dock. It cost complete upwards of $100,000 and had a capacity of 600,000 cu. ft. of storage room (compare this 17 cents per cubic foot with present costs). Temperatures of the rooms ranged from 10 to 60 F. The president of the company was A. I. Dexter, inventor of the "Dexter System of Cold Storage." Mr. Dexter designed the plant and it was erected and installed under his personal supervision.

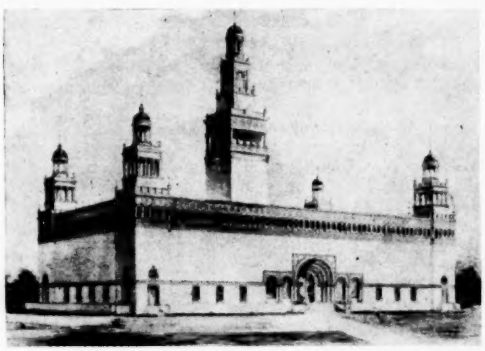


View of the Milwaukee Cold Storage Co. plant published in June 1893 issue of ICE AND REFRIGERATION. This plant was five stories high, with basement, with a frontage of 145 ft. on Read St. and a depth of 140 ft. on the dock. It had a storage capacity of 600,000 cu. ft. and cost upwards of $100,000.

This system consisted in circulating cold air, cooled by ice, around the storage rooms thereby excluding outside heat and obtaining, as claimed, a colder temperature than by any other system, with ice alone. In connection with this circulation, a system of freezing tanks was used, by means of which the temperature could be quickly reduced to any degree needed, it being practicable to lower the temperature from 32 F. to 10 F. within two hours, and the

temperature could be held at any point desired as long as needed.

The claimed advantage of the Dexter system over other systems is that the temperature could be held at an unvarying point whatever the outside condition might be, hot or cold; and that by means of this system the air could be kept as dry as is possible by any mode of refrigeration, as all the moisture in the room was formed into ice on the outside of the tanks. In other systems the air had direct connection with the ice. In this system air was introduced from outside directly; was then cooled to the temperature of the storage room, and the moisture condensed from it before it entered the cold room, by which thorough fresh air, ventilation was obtained without moisture or raising of the temperature. The results accomplished were the same as those of the machine system, without entailing the regular expense of the latter, which required a large outlay for machinery, coal and wages for labor in keeping the machinery running.



Picture of the cold storage and ice making pavilion built for the World's Columbian Exposition in Chicago in 1893. It had cold storage space for 700,000 cu. ft., ice making capacity of about 90 tons per day, an ice skating rink and a display of refrigeration machinery.

A first-hand description of this plant is furnished by H S. Paull, president of the Milwaukee Cold Storage Co., with which he has been connected since March, 1893. Mr. Paull recalls that it was at first cooled entirely with ice and salt. The actual storing space consisted of three floors comprising the basement and the first and second floors, or about 300,000 cubic feet of usable space.

From the ceiling of the second floor to the attic floor, a distance of about 18 feet, there was storage space for about 125 carloads of ice, which was an entire year's requirements. The ice was shipped from Pewaukee Lake during the month of January and had to be hoisted up to the ice chamber by small portable elevators, one cake at a time, outside the building.

Passageways or aisles through this mass of ice were necessary to allow for access to openings in the floor leading to storage rooms below through 16-inch galvanized iron tanks, which were filled with broken ice and salt every day to supply the necessary refrigeration to maintain temperatures in the rooms below, ranging down to 32 F.

About 1900 this plant was equipped with mechanical refrigeration and remodeling and improvements have been made from time to time which has kept it constantly abreast of modern methods at all times.

Mr. Paull concludes his remarks with the expression that cold storage methods now, in 1949, are a far cry from the early days of refrigeration with natural ice.

Cold Storage and Ice Making Pavilion at Columbian Exposition

One of the features of the World's Columbian Exposition in Chicago in 1893 was a cold storage and ice making pavilion. The specific purpose of this plant was to provide cold storage for food supplies used by the restaurants on the grounds, and ice for refreshment counters, ice cream freezers, soda fountains and water stands. The concession was granted to the Hercules Iron Works of Chicago who not only built a practical ice making and cold storage plant but also made an exhibit of the machinery and appliances used. Supplementing the original plans an ice skating rink was installed on the top floor.

The building covered a space 130 x 255 ft., was five stories high and at each corner there was an imposing tower 100 ft. high with observatories reached by elevators. A central tower was 191 ft. high. The cold storage space was 100 x 130 ft., four stories high. and with over 700,000 cu. ft. of space divided into rooms of various sizes where all kinds of meats, fruits, butter, eggs, vegetables, etc., were kept at their proper temperatures.

For the cooling of these cold and freezing rooms all of the three systems which had met the approval of experts at that time were used (1) by indirect circulation in which the air was cooled by the direct expansion pipes on the fifth floor and circulated by means of fans and otherwise in the various rooms below; (2) by the direct expansion system; (3) by the brine circulation system.

The insulation of this building will be of interest as an example of what was considered good practice for those days. Taken from the December, 1892, issue of ICE AND REFRIGERATION, the description is as follows: The outer wall was covered with a composition of plaster of paris and hemp fiber, made in one-inch slabs, nailed to the framework immediately over the system of lathing which was nailed to and strengthened the studdings, then a layer of matched flooring, then a layer of P & B paper and another layer of flooring, leaving a 6-inch air space. After the second layer of flooring were more 2 x 6 studdings, making another air space, inclosed again by the same system of two layers of flooring between which was a layer of P & B paper.

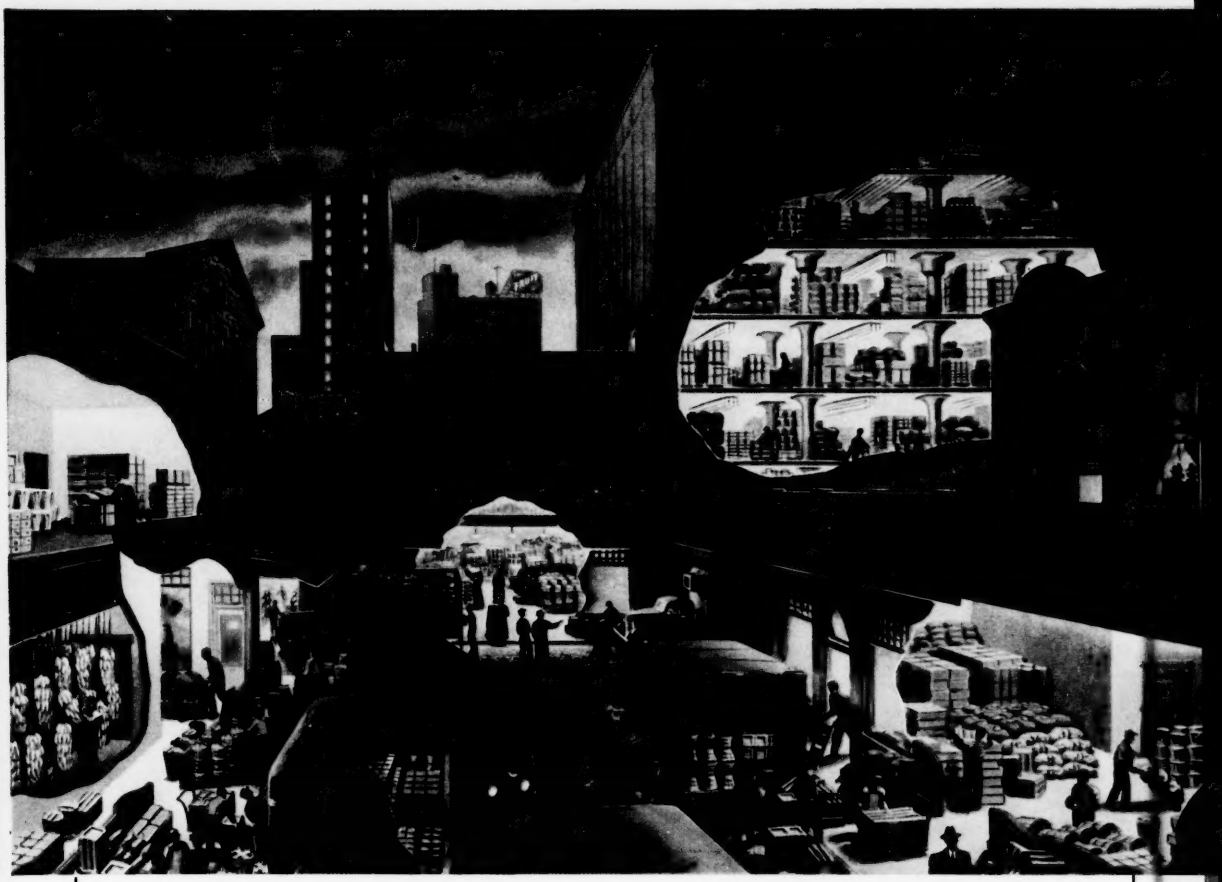
The cold storage rooms and ice room were again inclosed within insulated walls of matched flooring, a layer of P & B paper, 2 x 3 in. studding, forming spaces which were filled with mineral wool, flooring, paper, flooring, another air space made by 2 x 6 in. studding, flooring, paper and flooring.

These, it was stated, were the materials and method most commonly employed in cold storage construction and might, therefore, be taken as a model for permanent cold storage warehouses where the original outlay for building was limited and the construction of wood alone, "as in so many cases in practice, it was."

This building and its contents were destroyed by a disastrous fire July 10, 1893. The catastrophe was described in ICE AND REFRIGERATION in part as follows:

"The burning of the cold storage house at the World's Fair on July 10 last, was one of the most appalling calamities Chicago has seen in many years, and it will be probably, one of the most serious American casualties of the year 1893. The great loss of life, the large money value destroyed, and the tremendous rapidity with which the destroying element accomplished its terrible work will ever mark it an exceptional one in the history of the calamities of late years. Sixteen men, eleven of whom were members of the fire department, perished and in addition, some fifteen men were injured.

(Continued on page 26)



How a Produce Terminal Operates

FRESH strawberries in New York in January and golden ripe bananas 12 months of the year are accepted as routine by most people today. Fresh vegetables and fruits, in and out of season, domestic and imported, are commonplace on the menu. The activity and facilities necessary to make this miracle of supply possible are little known to most persons.

In a full-color page presentation entitled "How a Produce Terminal Operates" in The Saturday Evening Post of November 20 the Armstrong Cork Company, in cooperation with the National Association of Refrigerated Warehouses and the National League of Wholesale Fresh Fruit and Vegetable Distributors, has attempted to explain to the public how fruit and vegetables are kept fresh in the transition from the growing fields to the neighborhood store.

By means of a graphic cutaway view of a typical produce terminal, reproduced above and accompanying editorial explanation, the advertisement tells how modern refrigeration and cold storage facilities and "know how" have made modern fruit and vegetable distribution possible.

Offered free to readers of the advertisement are 21x22 in. full color enlargements of the cutaway view of the produce terminal. Suitable for framing, the enlargements are expected to be in demand by produce terminal and warehouse operators for use in training personnel, for explaining their business to visitors and by students studying the background of modern developments.

The copy of the presentation reads in part:

"From midnight until after dawn each day, the fresh fruits and vegetables for your table pour through a busy, crowded wholesale district. From the growing fields to your neighborhood store, that produce is kept fresh by keeping it cold.

"In modern cross-country trucks or in refrigerated railway cars, huge volumes of food are brought to the produce terminal from all parts of the country. Full trucks or carloads often go to one dealer . . . Produce men try to sell their entire stock every morning. If they can't, they safely hold it in coolers. Some foods can be stored for much longer periods in the refrigerated warehouse. This huge building acts as a reservoir where surplus foods are stocked in time of plenty, to be moved to market during off seasons. On the lower floors, fruits and vegetables are kept fresh at temperatures above freezing. The upper floors operate at zero or below, keeping frozen foods safely for many months."

(Continued from page 24)

The Hercules Iron Works, owner of the plant, suffered a loss of $250,000 with practically no insurance. The company made an assignment in County Court for the benefit of creditors.

Prejudice Against Cold Storage Foods

The problem of prejudice against foods that had been held in cold storage, early created a major problem which has been with the industry ever since. It is doubtful if any other business has had to contend so much against popular prejudice, legislative enactments, control and regulations as the cold storage industry.

The historical development of refrigeration was not such as to assure the consuming public that it was a benefit, rather cold storage goods were regarded with suspicion. In addition to the fact that some were sold that were approaching the inedible state, accidental freezing was known to injure such foods as oranges, apples, and canned foods. And so, if an orange was inedible after it had been frozen, it was reasoned that frozen fish or meats might also be of inferior quality. Thus in popular thinking all cold storage foods were branded as unfit or of poor quality.

The cold storage industry did not answer these objections by proclaiming the technical and economic benefits of refrigeration as a perservative, nor did it try to correct its weaknesses. Frozen or cold storage foods were never sold as such, but were invariably defrosted and presented to the public as fresh. To the already long list of reasons for public suspicion was added another—that of the defensive and apologetic attitude of the cold storage industry. If the cold storage people themselves kept their services secret it was thought that surely something must be wrong with them.

Accordingly, it became fashionable to pass laws restricting and regulating cold storage. A "uniform" cold storage law was drafted and proposed to be enacted by the several states. Some fifteen of them enacted it, and about sixteen others enacted laws of the same general type. In most of the later provisions, these laws were reasonable and beneficial. Sanitary requirements, inspections by authorized public officers, reports, license systems, and other features were in the public interest.

But in earlier years there were objectionable features such as requiring that foodstuffs preserved by refrigeration be unfavorably advertised. Signs were required to be displayed, in effect warning the prospective purchaser in large type that these were cold storage goods, and implying that if he bought them he did so at his own risk. This tendency assumed such a menace that active intervention by the American Warehousemen's Association became necessary to prevent a floor of restrictive and unfair legislation.

This prejudice however continues to exist and the general public attitude is well expressed by W. R. Woolrich in the Southern Power Journal, September, 1928, as follows: "The first mental picture that springs before fully half of the American people when you introduce the subject of cold storage is that of some egg storage room from which specimens that are none too fresh are drawn at intervals that are none too frequent."

An early view on this subject was stated by Dr. John A. Wiley of Pure Food fame, then Chief of the Bureau of Chemistry of the U. S. Department of Agriculture, speaking at the 15th annual meeting A. W. A. in 1905.

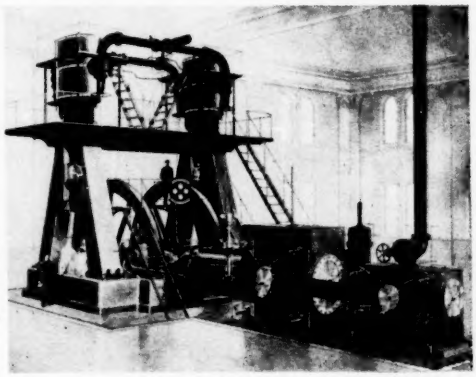
"There are thousands of people in this country who have a most unreasonable prejudice against anything that has been kept for any length of time in cold storage. This attitude of the consumer is one which you will run up against all the time when you are preserving a food product. And you are not going to remove the prejudices of people against them by trying to conceal any fact, nor by trying to deceive them in any way or in any respect regarding the materials which you offer them.

"There is a lot of hesitancy among people in this country in buying certain products today because they fear they have been in cold storage. If I say to you, gentlemen, as I am going to say, that the way to overcome this prejudice is to plainly mark your goods 'Cold Storage Goods,' you will probably all object, and say, 'We cannot tell them.' But I say to you that you have no right to sell to any consumer any substance that has been in cold storage for any reasonable length of time, on the supposition that he is getting a fresh article.

"You have no ethical right to do it, and as long as you continue to try to do it, you will not only not eliminate the prejudice, but will increase it against your products. Sooner or later the consumer will come to discriminate and

In Other Days —

THIS giant steam engine driven ammonia compressor was built by the Pennsylvania Iron Works in 1894 and installed in the plant of the Quincy Market Cold Storage & Warehouse, Boston. Rated at 515 tons refrigeration it had two vertical single acting ammonia compressor cylinders, 26 in. bore by 44 in. stroke. The steam driving engine was compound tandem condensing type with steam cylinders 24 in. and 44 in. in diameter and 60 in. stroke. There were two fly-wheels of 16 ft. diameter weighing 30,000 lbs. each. The overall dimensions of the machine were 24 ft. high, 45 ft. long and 20 ft. wide. Weight was 200 tons.



Other features of this plant described in the December, 1895, issue of ICE AND REFRIGERATION are also interesting. Electric welding was used to join piping. One brine cooling tank contained more than 28,000 lineal feet of 2 in. ammonia pipe. The coils in the brine tank were almost free from joints as the pipe was electrically welded into long continuous runs.

The egg storage building had banks of brine coils on the top floor and blowers circulated air through the storage rooms and back over the coils. Direct expansion ammonia coils in special rooms with blowers to circulate the air were also employed on rooms holding cheese, fresh and dried fruits and for the freezing of poultry. These poultry freezers had high velocity air circulation which maintained the rooms at from 10 to 20 deg. below zero F.

Use of these blower refrigeration systems was attributed to George D. Stoddard, then manager of the company who claimed no credit for originating the method. It is evident that unit coolers and blast freezers are not a new idea.

demand to know whether the goods you offer him are fresh or whether they have been preserved. And this is only the right of the consumer. . .

"The people who are refusing to buy this line of goods, if they do not want cold storage products, will buy more of the fresh products which they know are fresh, and you will get a better market and a better price for those which have been properly preserved. Secrecy is no longer an 'Open Sesame' to commercial supremacy and success."

In the trust-busting days of the early 1900's, big business generally was the object of attack from all sides, political and legislative. Refrigeration was thought to be employed by the food barons as a device for hoarding the necessities of life, holding up prices and exacting unearned tribute from the common man.

Investigations

During the height of the agitation against cold storage, there were several investigations by impartial bodies to determine the place of cold storage in marketing food products. The Chicago Association of Commerce, after careful and painstaking study, published the following findings:

"In reference to the charge that cold storage of food products causes a scarcity and an inflation of prices, the fact appears to be that only a small percentage of the annual production of perishable foodstuffs is stored in cold storage warehouses. The storage of these foodstuffs, however, makes it possible to supply the people of the great metropolitan centers in time of scarce production with the surplus of the time of plentiful production."

Another viewpoint on this important question was expressed by one of the speakers at the 1914 A. W. A. Convention, as follows:

"I believe that the dealers who have been practically tricking the public in the sale of food products are going to find out very shortly that they must sell goods for just exactly what they are, and as soon as the public finds out there is a standard cold storage food I believe they are going to demand it, and when that time comes there will be no excuse for the dealer practicing this trickery upon the public any longer, and I believe too, that it will result in our packers creating a standard for their product, and being more particular about that standard than ever before, because a good standard cold storage product is bound to have a buyer, and after that buyer is once satisfied he is going to continue to ask for that particular product, just like a man does with a cigar, or any luxury that he demands from time to time."

The recorded discussion following this statement however showed clearly that there were many who did not agree with this speaker, although the same thoughts had been expressed previously by Dr. Wiley.

One fact that should have deeply impressed itself on the minds of all, particularly legislators, was the absolute necessity of cold storage warehouses, and facilities for prompt handling in and out, of enormous quantities of foodstuffs of all kinds during world War I. If restrictions which were proposed had been carried into effect the immense quantities of foods of all kinds that were immediately necessary for the sustenance of U. S. soldiers at home and abroad would not have been available. This was true of World War I and also true of World War II.

Effect of Wartime Economy—The Two World Wars

World War I threw an unexpected problem on the cold storage industry and all facilities were strained to the utmost to care for the load. In normal times quarter beef is not held in cold storage in large amounts, owing to the ability of the meat packers to supply their trade without the use of large reserve stocks. The war produced a different situation. The meats for the allied troops and the civilian populations in Europe all came from the United States and it was largely quarter beef.

Other customary sources of European supply, South America and Australia, were not available, owing first to the submarine danger, and second to the fact that it takes four times as long for a ship to make the round trip to Europe from those countries as for ours, necessitating four times as much shipping to take care of the load.

These meats were necessarily assembled for cargo in cold storage and frozen to insure arrival in good order. This meant a tremendous and unusual stock of meat for the warehouses to handle in addition to the wartime increase in other commodities. On January 1, 1918, there was in storage in the United States for account of the War Department a total of 325,000,000 lbs. of meat.

Survey of Space

Prior to the entrance of the United States into the war a survey was made of cold storage space. This survey showed approximately 475,000,000 cu. ft. of storage space of which about 125,000,000 cu. ft. was available for freezing temperatures. The heavy demands for frozen meat threw such a heavy load upon the freezers that additional freezer space became necessary and as a result the United States Cold Storage house was constructed at Chicago, capacity of the Bush Terminal docks in Brooklyn was increased and a contract was let for other increases but they were terminated by the signing of the armistice.

Later, from 1920 to 1925 there was considerable activity in the cold storage field, particularly in the plants serving the apple territory. During this same period there were many promotional ventures in the field and the building of a number of railroad terminal warehouses. This, together with the new cold storage space added for war needs resulted in an overproduction of facilities and consequent disruption of the refrigerated warehousing industry, from which it did not fully recover until the advent of World War II.

In 1940 when it was seen that another World War was imminent, the industry took steps to see that a repetition of this inflation of storage space did not occur again. A Defense Committee was appointed by the National Association of Refrigerated Warehouses with Vallee Appel as chairman to represent the industry in contacts with government agencies. A basis of understanding was effected with these agencies and the secretary, Wm. M. O'Keefe of the Association, was given a leave of absence to represent the committee in Washington. Later at the Committee's suggestion, J. R. Shoemaker was appointed Chief of the Refrigerated Warehouse Section, Office of Defense Transportation and Wm. O'Keefe became his assistant. They employed their knowledge of the industry to assure that policies and methods adopted would be sound and would permit the refrigerated warehouses of the country to maintain their greatest usefulness and be the most effective in the war effort.

With this good basis for cooperation established, the industry proceeded with the task of providing the space required for supporting a war food program. Additional space was placed under refrigeration and much cooler space was converted to freezer. Existing warehouses at several locations in the country did not have sufficient space available to accommodate the expanded and altered requirements of war time. Especially this was true at certain port areas where the export of foods mounted quickly to a volume never before anticipated. Some warehouses were erected by government agencies but in the aggregate these were small in proportion to total industry capacity.

As a result of this association activity it is believed that the nominal amount of additional freezer space created will not lead to the over supply that plagued the industry for so many years following the first World War.

Cold Storage Legislation—Warehouse Receipts

One of the early problems of cold storage warehousemen was that of warehouse receipts. At the annual meeting of the American Warehousemen's Association held in Chicago, October 19, 1892, J. R. Pride read a paper on that subject in which he stated that the laws of the various states differed so widely and court decisions were so conflicting that it was impossible to prepare a uniform warehouse receipt.

Reflecting the continued confusion of those days regarding warehouse receipts, Mr. Price at a later association meeting continued: "Warehouse receipts that are intended to be non-negotiable are very dangerous documents. In many instances a receipt that is intended to be merely a memorandum, not even possessing the dignity of a non-negotiable receipt, we might say, is in the eyes of the law (in some cases) a full fledged negotiable warehouse receipt; and the warehouseman should fear them much more than the receipts he issues, knowing them to be negotiable."

The subject was thrown into the lap of the Committee on Laws and Legislation of the American Warehousemen's Association. In 1904 this committee appeared before the Conference of State Commissioners for Uniform Laws and tendered this conference a sum of money to cover expenses of presenting a uniform code of laws covering warehouse receipts. The subject was placed in the hands of Prof. Williston of Harvard University who was assisted by Barry Mohun in preparing such a codification.

At the annual convention held December 7 to 9 at Washington, D. C. a full report was presented on the question of devising legislation to define a uniform warehouse receipt and fix its value as a commercial paper. A part of this report was a list of fundamental requirements that it was thought should be written into the proposed code. Although no definite action was taken by the Convention aside from instructing the Committee on Laws and Legislation to continue its work, real progress toward a solution of this problem was apparent.

A uniform warehouse receipts act finally was prepared and was adopted in 1907 by a number of states including Connecticut, Illinois, Iowa, Massachusetts, New Jersey, New York and others. The measure was adopted gradually by other states until they all came under its jurisdiction.

This original law was practically the same as the one in force at present, with the exception of a few minor revisions and changes wrought by numerous court decisions. It is interesting to note that the Conference of State Commissioners for Uniform Laws is the same organization as is now functioning under the name of The American Law Institute which is now engaged in preparing a revision and codification of all commercial law as described in another article in this issue.

During the session of Congress in 1910 and 1911, when there was much talk in the newspapers and elsewhere about the high cost of living, there were introduced into Congress several anti-cold storage bills. At a meeting of approximately sixty-five cold storage men in New York, a committee of five men was appointed to handle the matter in behalf of the industry. The committee consisted of Frank A. Horne of New York, chairman; Mr. Utley of the Quincy Market Cold Storage Co., Boston; Homer McDaniel of the Sheriff Street Market & Storage Co., Cleveland; J. F. Nickerson, of ICE AND REFRIGERATION, Chicago; and R. H. Switzler of the St. Louis Refrigerating and Cold Storage Co., St. Louis. This committee functioned for eighteen years, opposing various cold storage bills introduced into Congress in succeeding sessions.

Research

In the early days of cold storage, products were stored largely by guess as to proper temperature and humidity conditions. The lack of this knowledge was recognized and as early as 1901 it was reported that the U. S. Department of Agriculture had obtained an appropriation of $1,000 to study the effect of cold storage upon fruits and their shipment abroad. For the following year it was expected that additional funds would become available to inquire into the nutritive value of cold storage goods and the effect of cold upon them and how long they could well stand the cold rooms.

That this work produced results is shown in the report of the A.W.A. convention in 1904 made by Homer McDaniel of Sheriff Street Market & Storage Co., Cleveland, Ohio, chairman of the cold storage committee. Mr. McDaniel said, "From these meetings we return to our work to solve its problems, not under the hard taskmaster of experience but easily approaching a sure solution along a pathway illuminated by the torch of exact knowledge and science which the able corps of the Agricultural Department has graciously bestowed upon us."

At that same convention it became clearly evident that more knowledge was needed as to how best to preserve foods by cold storage. Dr. Harvey W. Wiley again assumed the role of spokesman for the industry when he announced that the Secretary of Agriculture had been authorized to investigate the effects of cold storage upon the wholesomeness of food kept therein. But although Congress had authorized this investigation, it had neglected to make funds available and so Dr. Wiley and his assistants had carried on with odds and ends of other appropriations.

In the meantime, to meet this situation which the Department had not planned and had not expected, the people engaged in the cold storage business were consulted to get their views regarding the nature of the problem. A circular was addressed to them and these were filled out very generously and an immense amount of very valuable information was obtained. Thus was shown the value of industry cooperation for the collection of trade information.

A more recent view on this important subject was expressed by Dr. Donald K. Tressler at the 1930 convention of the A.W.A. "Probably the most rapid strides commercially have been made in the fisheries, and large volumes of quick frozen fish are now being distributed in areas where these products were not previously available. During the past year, however, there has been a marked advance in the commercial distribution of fruits and vegetables, and the distribution of frozen meats is already assuming commercial aspects in many sections. The necessity for further research and investigations is fully realized, and those responsible for the commercial introduction of these products have preferred to move slowly in a realization that after all the goal must be reached by an evolutionary process.

Refrigeration Research Foundation

In 1943, after deliberation and study of research facilities and organizations of various kinds, the refrigerated warehousing industry established the Refrigeration Research Foundation. Its accomplishments to date and some of its plans for the future are outlined in other articles in this issue.

Furs and Fabrics

The cold storage of furs and fabrics at first carried on in a desultory way by warehousemen, by 1916 had become an industry of no small extent. The first cold storage house to handle furs was the Terminal Warehouse Co., New York. About 1890 this concern set apart special rooms for this class of storage and the company did quite a business. The attention of other houses was attracted to this feature, but no special effort was made to take it up extensively until 1895 when Dr. Howard, chief of the Bureau of Entomology, U. S. Department of Agriculture, conducted a series of experiments on the effect of cold storage upon the clothes moth. In 1897 two rooms were erected for the Lincoln Safe Deposit Co., New York, and a fur storage business installed, which was very successful. The same year Revillon Freres, furriers, started a storage plant using the indirect system, fanning the air from a bunker room. Most plants are now using the indirect system, although some continue to use a direct brine system.

Cold Storage and the Poultry Industry

The drift of people to the cities carried them further and further away from the farm market and this made it more difficult for the producer to deliver eggs, poultry and butter produced on the farm to consumers. Live poultry frequently was shipped to city slaughter houses but, more often than not, that meant a decreased price to the farmer.

There was a plentiful supply of natural ice which could be stored for a year's supply. Some of the early poultry buyers dressed chickens and removed animal heat by packing them in crushed ice. This kept them in good condition for several days and packed in this way, they were shipped by freight from the middle west to the eastern markets. When it happened that more were shipped than the market could absorb, prices dropped and the poultry dealers lost money.

As the supplies of dressed poultry increased and the distances grew longer, however, a considerable amount of this dressed poultry reached the markets in an inedible condition. The shippers laid the blame for this condition on the refrigerator cars, or the slow schedule, and many claims for damages were made which the railroads refused to pay. About 1905, representatives of the U. S. Dept. of Agriculture made investigations in the laboratory and in the field to study the subject of handling of poultry and eggs. They were able to point out detrimental commercial practices to such an extent that important and valuable changes were made to devise orderly procedures and, as a result, the amount of deteriorated poultry and eggs on the market decreased.

Sixty years ago, the high production of eggs in the early spring and decreased production in the autumn and winter caused prices to drop in the spring and rise to a luxury level in the fall and winter. The advent of cold storage for the preservation of eggs enabled the dealers to store the over-supply and feed it to the market during the low production period to such an extent that the market, both supply and price, was leveled out. The advantages of cold storage for the preservation of perishable foods is probably best illustrated in the use of it for eggs.

Ice and Refrigeration and Refrigerated Warehousing

IN THE first issue of ICE AND REFRIGERATION, Vol. 1, No. 1, issued July 1, 1891, the refrigerated warehousing industry was represented by a "Cold Storage Department," and this attention to one of refrigeration's dominant industries has continued ever since. In fact the progress and achievements of the associations representing the industry were recorded as they happened.

The cold storage section of this first issue consisted of an editorial pointing to the chances offered by the cold storage business, "not necessarily in the great cities where the demand for cold storage accommodations is being freely met . . . but in the lesser cities nearer the farms." They would come in time, it was thought, but like all great improvements of whatever sort they were expected to come slowly —especially in the northern states where, for a large part of the year, such storage is not looked upon "as of great importance as it really is."

The organization meeting of the American Warehousemen's Association was held in the Grand Pacific Hotel in Chicago Thursday, October 15, 1891. This date is of interest for two reasons, the second being that it was the same year that ICE AND REFRIGERATION was established, the first issue appearing July 1, 1891. The story of the refrigerated warehousing industry since 1890 is, therefore, the stories of the Association of Refrigerated Warehouses and ICE AND REFRIGERATION as this year they both arrive at their 58th anniversary.

At that meeting, sixteen warehousemen, including several cold storage executives, got together under the direction of Percy Thompson of Kansas City, Mo., as temporary chairman. The organization was perfected and before the meeting adjourned James A. Green, of the Union Storage and Transfer Co., Detroit, Mich., was elected first president.

The cities of Detroit, Cleveland, Kansas City, St. Louis, Chicago, San Francisco, Rochester, Indianapolis, Peoria, New York, Buffalo, Cincinnati, Milwaukee and Nashville were represented at that first meeting, and the records show that the following cold storage men were in attendance: Robert Hewitt, Ganzevoort Freezing & Cold Storage Co., New York City; R. G. Martin, Buffalo Cold Storage Co., Buffalo, N. Y.; S. Bailey, Union Storage Co., Pittsburgh, Pa.; LeGrand Smith, Union Cold Storage Warehouse Co., Chicago, Ill.; T. S. McPheeters, McPheeters Warehouse Co., Chicago, Ill.

Anniversary Meeting

At the fiftieth anniversary meeting of the A.W.A. held at the Edgewater Beach Hotel in Chicago, February 11-14, 1941, a skit was presented. This skit reproduced the lobby conversations and sessions of the organization meeting held in the Grand Pacific Hotel, Chicago. At the first session, leading warehousemen spoke on the need for negotiable warehouse receipts and other current problems, committes were appointed, and officers were elected.

At the final session, reports of committees were read, comments were made by those present on the need and possibilities of the new Association, and the meeting was brought to a fitting close by a stirring appeal by the newly elected president for cooperation and wholehearted support of the newly organized American Warehousemen's Association.

This skit, based on the official minutes, was an authentic reproduction of that historic meeting. The personnel, dressed in the styles of that date, represented the warehousemen who were present and took part in the original meeting. Actual committee reports were read and in the discussions the

words were the same as were actually spoken at this meeting.

Concluding this part of the program, an enlarged portrait of James A. Green, the first president, was presented to G. K. Weatherred, present president of the A.W.A., who accepted it on behalf of the association and said it would be hung in the offices of the Association which were then in Chicago.

Cold Storage Interests

Cold storage interests, at first a minor part of A.W.A., soon came to be recognized through the appointment of a Committee on Cold Storage and this committee was active until 1917.

At the 27th annual meeting held in Detroit, Michigan, December 5-7, 1917, the Cold Storage Subdivision was formed with the following as members of the executive committee: F. A. Horne, Homer McDaniel, R. H. Switzler, R. A. Douglas, Jr., Herbert Moore and George H. Stoddard. Dues were established at $40 per year, $25 to the A.W.A. and $15 to the subdivision. In 1931 the name was changed to the Association of Refrigerated Warehouses, the organization setup and program remaining the same.

Percy Thompson, Kansas City, Mo., who was chairman of the original organization meeting, served the A.W.A. as secretary for some years and was the driving force behind many of its projects. Following Mr. Thompson, Walter C. Read became general secretary and served until 1912 when his place was taken by Charles L. Criss who served until 1923. These men served both A.W.A. and the Cold Storage Division.

In 1923, Ralph C. Stokell became secretary of the Cold Storage Division serving in this position with offices at Chicago until 1927. Wm. M. O'Keefe, the present secretary, took over the duties of the office in 1928. In 1947 the position of executive vice-president was created and Wm. Dalton was chosen to assist and direct the work of the association.

Annual Conventions

At one time the Cold Storage Division discussed the question of withdrawing from the A.W.A. and affiliating with the American Institute of Refrigeration, but nothing came of it. Since the original organization meeting in 1891 annual conventions have been held every year, with the exception of 1945 when it was cancelled because of the war ban on travel. At each of these conventions, refrigerated warehousing had a prominent part in the program. Annual meetings were held as follows:

Executive Direction

Prior to 1923 the executive direction of the Cold Storage Division was in the hands, first of the chairman of the Committee on Cold Storage then of the Chairman of the Cold Storage Sub-Division and then of the divisional vice-president of the Cold Storage Division. In 1923, the office of President was established and George M. Weaver, who had been serving as divisional vice-president, was elected to that position and served therein until 1926. The complete list of presidents of the Cold Storage Division, later known as the National Association of Refrigerated Warehouses, follows:

George M. Weaver, Chicago, Ill. 1923-1926.
H. C. Lewis, New York, N. Y. 1926-1927.
Gardner Poole, Boston, Mass. 1927-1928.
Odin C. Mackay, Boston, Mass. 1928-1930.
Vallee Appel, Chicago, Ill. 1930-1932.
Wm. J. Rushton, Birmingham, Ala. 1932-1934.
Harry S. Hall, Detroit, Mich. 1934-1936.
G. F. Nieman, Pittsburgh, Pa. 1936-1937.
C. Goodfellow, Fort Worth, Tex. 1937-1939.
R. M. Hagen, Los Angeles, Calif. 1940-1941.
E. G. Erickson, Chicago, Ill. 1942-1943.
Frank A. O'Hara, New York, N. Y. 1944-1945.
Harlan J. Nissen, Los Angeles, Calif. 1946-1947.
H. W. Wilson, Philadelphia, Pa. 1947-1948.
Edgar M. Burns, Portland, Ore. 1948-

Early Conventions

The second annual meeting was held again at the Grand Pacific Hotel in Chicago, October 22, 1892. Some thirty members were present, representing as many leading storage houses of the country engaged in general storage and, in few instances, cold storage interests.

The aim and object of this association, the report in ICE AND REFRIGERATION states, was the elevation and conservation of the storage business, and the discussion of the general and legal principles involved in the business and also the elevation of the character and value of warehouse receipts as "collateral" property.

A number of valuable papers touching on these questions were read; after which the following officers for the ensuing year were elected: President, F. A. Warner, Chicago; vice-president and chairman of the executive committee, J. R. Price, Cleveland, Ohio; secretary and treasurer, P. Thompson, Kansas City, Mo.; executive committee: T. S. Bartless, New York; W. G. Coldeway, Louisville, Ky.; Philip Godley, Philadelphia, Pa.; T. S. McPheeters, St. Louis, Mo.; S. Bailey, Jr., Pittsburgh, Pa.; and James A. Green, Detroit.

A resolution was passed extending a general invitation to all warehouses of good standing in the United States to be-

Annual Conventions American Warehousemen's Association

1891—Grand Pacific Hotel, Chicago, Ill.
1892—Grand Pacific Hotel, Chicago, Ill.
1893—Galt House, Louisville, Ky.
1894—Chamber of Commerce, Cleveland.
1895—Bourse Assembly Rooms, Philadelphia, Pa.
1896—Chamber of Commerce, Boston.
1897—Chamber of Commerce, Nashville, Tenn.
1898—Board of Trade & Transportation, New York.
1899—Auditorium Hotel, Chicago, Illinois.
1900—Southern Hotel, St. Louis, Mo.
1901—Niagara Hotel, Buffalo, New York.
1902—New Willard Hotel, Washington.
1903—New Willard Hotel, Washington.
1904—New Willard Hotel, Washington.
1905—New Willard Hotel, Washington.
1906—Hotel Jefferson, St. Louis, Mo.
1907—New Willard Hotel, Washington.
1908—New Willard Hotel, Washington.
1909—Hollenden Hotel, Cleveland, Ohio.
1910—New Willard Hotel, Washington.
1911—Hotel LaSalle, Chicago, Ill.
1912—Hotel Schenley, Pittsburgh, Pa.
1913—Hotel Dennis, Atlantic City, N. J.
1914—Hotel Baltimore, Kansas City, Mo.
1915—Hotel Astor, New York, N. Y.
1916—Hotel Chamberlain, Old Point Comfort, Va.
1917—Hotel Statler, Detroit, Mich.
1918—Hotel McAlpin, New York, N. Y.
1919—Hotel Gibson, Cincinnati, Ohio.
1920—Greenbrier Hotel, White Sulphur Springs, W. Va.
1921—Hotel Statler, St. Louis, Mo.
1922—Statler Hotel, Cleveland, Ohio.
1923—Rice Hotel, Houston, Tex.
1924—The Drake Hotel, Chicago, Ill.
1925—New Willard Hotel, Washington.
1927—Kansas City Athletic Club, Kansas City, Mo.
1928—French Lick Springs Hotel, French Lick, Ind.
1929—Los Angeles-Biltmore, Los Angeles.
1930—Edgewater Gulf Hotel, Edgewater Park, Biloxi, Miss.
1931—The Ambassador, Atlantic City.
1932—Book-Cadillac Hotel, Detroit, Mich.
1933—Hotel Gibson, Cincinnati, Ohio.
1934—The Coronado Hotel, St. Louis, Mo.
1935—The Roosevelt Hotel, New Orleans.
1936—Hotel Traymore, Atlantic City, N. J.
1937—The Drake Hotel, Chicago, Ill.
1938—Hotel William Penn, Pittsburgh, Pa.
1939—Hotel Adolphus, Dallas, Tex.
1939—Edgewater Beach Hotel, Chicago.
1940—Edgewater Beach Hotel, Chicago.
1941—Edgewater Beach Hotel, Chicago.
1942—French Lick Springs Hotel, French Lick, Ind.
1943—Edgewater Beach Hotel, Chicago.
1944—Edgewater Beach Hotel, Chicago.
1945—No convention.
1946—Edgewater Beach Hotel, Chicago.
1947—Statler Hotel, Cleveland, Ohio.
1948—Haddon Hall, Atlantic City, N. J.
1949—Fairmont Hotel, San Francisco.

come members of the Association. "All questions of rates for storage, and their discussion with a view to fixing such rates uniformly, are barred; so that the association simply aims at an improvement of the business on legitimate lines, and is in no sense a monopoly or trust, nor has it any such end in view directly or indirectly for the future."

In 1900, representatives of cold storage warehouses in various parts of the country met for discussion of matters relating to the trade, on March 30, at the Hotel Iroquois, at Buffalo, N. Y.; S. Bailey, Jr., of Pittsburgh, being president and Homer McDaniels, secretary. The houses represented were the Quincy Cold Storage Co. of Boston, Mass.; the Merchants' Cold Storage Co. and the Gansevoort Cold Storage Co. of New York; the Kings County Refrigerating Co. of Brooklyn; Capitol City Cold Storage Co. of Albany, N. Y. Philadelphia Cold Storage and Warehousing Co. of Philadelphia, Pa.; Union Cold Storage Co. of Pittsburgh, Pa.; Syracuse Cold Storage Co. of Syracuse, N. Y.; Buffalo Cold Storage Co. of Buffalo; Union Cold Storage Co. of Chicago, Ill., and Sheriff Street Market and Cold Storage Co. of Cleveland, Ohio.

Thirteen houses were represented by letter. No formal resolutions were passed, but the general conclusion was reached that the rate on eggs should not be less than forty cents for the season for 30-dozen cases, and that the minimum rate for butter should be one-half cent for the season. The amount that could safely be loaned on goods in storage was discussed, 75 per cent of the cost of the goods at point of storage being considered the limit of safety. A committee was appointed to gather statistics in regard to cold storage. The subject of liquid air was discussed, but its impracticability for purposes of refrigeration was conceded by all.

Tenth Annual Convention

The following October, the tenth annual convention of the American Warehousemen's Association was held at the Southern Hotel, St. Louis, Mo., October 17, 18 and 19, 1900, 65 per cent of the total membership being in attendance. W. T. Robinson, president of the Philadelphia Warehousing and Cold Storage Co., and president of the Association, presided.

The report showed that the Association was in first-class financial condition, that the membership had been increased and that the interest of the various members was being well maintained.

At the second day's session a report was submitted by the Cold Storage Committee, followed by an interesting paper on the "Transportation of Perishable Products for the Past Fifty Years," by Edward G. Ward of the Department of Agriculture, Washington, D. C. Madison Cooper of Minneapolis read a paper on "Cold Storage" which was generally discussed. Among the subjects referred to in the reports and discussions, were the general protest against the continuance of the war tax on warehouse receipts, the insurance question, refrigerating devices and other items of interest to cold storage warehousemen.

Officers to serve for the ensuing year were elected as follows President, W. T. Robinson of Philadelphia, re-elected; vice-president, Charles L. Case of New York; secretary and treasurer, W. C. Reid of New York, re-elected. Directors: Philip Godley, Philadelphia; T. S. McPheeters, St. Louis; J. C. Melvin, Boston; S. H. Haslett, San Francisco; A. M. Read, Washington, D. C.; Samuel Bartley, Jr., Pittsburgh.

The eleventh annual convention of the American Warehousemen's Association was held at Buffalo, N. Y., October 16-18, 1901. Report of this meeting filled 37 pages in ICE AND REFRIGERATION. Of chief interest to cold storage warehousemen at this convention was the announcement that $1,000 had been appropriated by the Department of Agriculture to study the effect of cold storage upon fruits and their shipment abroad. There was also considerable discussion as to storage of vegetables and the best temperatures and humidities to which to keep them. A paper was read by John A. Starr and George H. Stoddard of Boston, on cold storage insulation and one on warehouse receipts by Wm. H. Gibson, New York City.

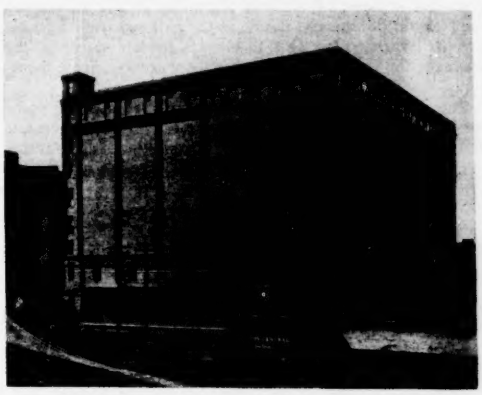
At the twelfth annual convention held at Washington, D. C., December 3-5, 1902, the business of the third day was devoted almost wholly to cold storage subjects. G. Harold Powell, chief of the Pomological Division, Department of Agriculture read a paper on the "Results of the Department's Cold Storage Investigations from the Practical Side." W. A. Taylor, of the Division of Pomology, gave an address on some of the results obtained through cold storage. Dr. Harvey W. Wiley, chief chemist of the Agricultural Department, read a paper on the "Chemical Problem Involved in

In Other Days —

Rapid Building—No Delays

IN 1903 a 2,000,000 cu. ft. cold storage plant was constructed in less than four months. The Chicago Cold Storage Warehouse Co. plant at Indiana Ave. and 16th St. is described in the November 1903 issue of ICE AND REFRIGERATION. Begun on April 1, the plant was receiving goods for storage on July 25 of that year.

Apparently the speed of erection did not result in any reduction of durability and performance of the structure. Walter Kopke, general manager of the storage company, now a division of Beatrice Foods, reports that the original warehouse remains intact. Only a few beams that deteriorated more rapidly have been replaced.



Complete details on the structure are given in the article mentioned. Thick, heavy construction was the rule as this excerpt shows:

"The insulation against the brick walls consists of one-half in. Portland cement plaster against brick, then four inches of hemlock shavings, kiln dried, then a seven-eighths-in. air space made by strips twenty-four inches apart with sixteen in. panels, and "Neponset" paper on each side of air space, then seven-eights in. d. and m. boarding; then eight inches of dry hemlock shavings; then seven-eighths in. d. and m. boarding; then another seven-eights in. air space of panelled strips laid same as before, then a layer of paper and seven-eighths in. d. and m. boards; then again paper and seven-eighths in. white-wood finish, making the total wall three feet, three inches in thickness for the lower floors and the actual insulation eighteen inches in thickness.

Cold Storage," and T. S. Palmer, chief of the Biological Division of the Department, one on the legal aspect of keeping game in cold storage during the closed season.

Reporting the thirteenth annual convention in 1903, ICE AND REFRIGERATION said that special interest centered about the meeting of the cold storage department and a large amount of valuable information was presented because of the presence of a number of special expert investigators of the United States government departments, who gave addresses or read papers giving the results of their recent investigations in the special branches which they represented.

The paper by O. P. Austin, chief of the Bureau of Statistics, Department of Commerce and Labor, on cold storage as related to international commerce, "was full of good suggestions which were further supplemented by Mr. Crowell's excellent address. Dr. Wiley's paper on the methods of producing extremely low temperatures and the practical results to follow was listened to with great interest, while all butter storers, and butter makers as well, could not fail to be edified by the address of Henry E. Alvord, chief of the dairy division, U. S. Department of Agriculture. Mr. Powell's address on fruit storage investigations will be read with interest and profit by everyone who stores fruit, whether in this country or abroad, as will also the formal report on The Apple in Cold Storage, by Mr. Powell and Mr. Fulton."

To list in detail the work of this association since its organization 58 years ago would require far more space than is available here. From the beginning it was recognized that the duty of the association as the national trade association for warehousing was to elevate the standards of the business for the benefit of not only warehousemen themselves but also for the public they serve.

The young organization proceeded immediately to work for the establishment of the integrity of warehouse receipts as representing the responsibility of the warehouse issuing it, and as a document of title for credit and lending purposes. This work culminated later in a Uniform Warehouse Receipts Act, ultimately adopted by all the states.

In later years, A.W.A. explored the field of modern cost-accounting and rating procedure for warehousemen, and established the scientific principles that underlie warehousing tariffs and rating practices today. Its publications in this field for both merchandise and refrigerated warehousing are recognized by government agencies, accountants, etc., as authorities on the subjects dealt with; and they have brought about a stability as to rating principles that has been in the interest of warehousemen and their public. This work is still being continued as a part of the service which it provides its members.

Practically throughout the entire life of the Association the various departments of the government have looked to it as the spokesman for the warehousing industry and, particularly for the refrigerated warehousing interests, the Department of Agriculture, with reference to research and statistics in the perishable food field. The National Recovery Administration recognized the A.W.A.'s two divisions as the trade associations properly qualified to formulate and administer respectively the merchandise and refrigerated warehouse codes of fair competition under the National Industrial Recovery Act. Similarly, in that emergency, as in 1917 and 1918, A.W.A. was called upon by government agencies to speak and act for these two branches of warehousing nationally in the part that they were taking in the National Defense Program.

During both world wars the association took a vital part with government agencies in providing warehouse space, the refrigerated warehousing interests pointing their efforts particularly toward expediting the movement of perishable foods.

Refrigerated Warehouses — 1949 Plants and Methods

By Emerson Brandt
Technical Editor ICE AND REFRIGERATION

ANY report on refrigerated warehouses in the United States will indicate considerable uniformity in operating objectives but much diversity in plant features and equipment. The situation indicates a healthy state in the industry which despite its 58 years of age has not reached a static condition.

The prime objective is to maintain original quality of the stored goods. Related to it is the care widely exercised to insure that commodities are in good condition when placed in storage. Then the industry agrees that storage conditions should be as close as possible to optimum temperature, relative humidity, and air circulating velocity. Correlated with this are sanitation and careful handling.

The plant features utilized to fulfill these objectives are another story and more diversity appears to enter the picture all the time. Perhaps the most striking example of this is in the insulating of warehouse buildings.

Structural Insulation

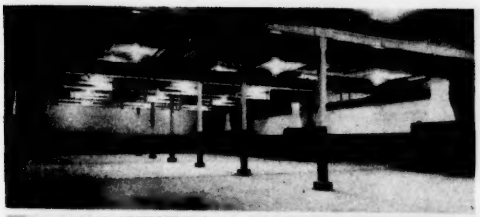
Warehouses as erected during recent years have utilized board, fill type and metal sheet insulation. Board forms have included cork, glass and rock fibers, and cellular glass. Among the fill types used are shredded redwood bark, expanded mica, regranulated cork and glass and mineral fibers. Coated sheet steel and aluminum sheets have both been used in recent years.

Whatever the type of insulation used, prime emphasis is placed on resistance to moisture infiltration with its depreciating effects on insulation. In the June 1898 issue of ICE AND REFRIGERATION a writer recommended a good coating of paint on the outside of brick walls of cold storage buildings to retard moisture infiltration. The battle to keep out moisture goes on with even greater emphasis today.

In a warehouse recently constructed the outside surface of the walls was completely coated with moisture resistent paint. Back-plastering of brick walls has been widely applied to give a smooth surface for application of a good moisture-proof membrane outside the insulation.

Hot asphalt has long been used and some designers recommend that cloth reinforcing be included in the asphalt as it is applied. Cold, ready to use, asphalts have come into wider use to avoid over-heating, prevent fires during erection, and obtain desired permanent characteristics in the moisture barrier. With sheet metal insulation moisture resistance is accomplished by sealing of joints, caulking or by lock joints.

Board forms of insulation, with few exceptions, are erected in hot or ready to use asphalt. Whatever the in-



Above—Overhead ducts are used to provide positive, controlled distribution of refrigerated air from floor type unit coolers in this 30 F. cooler room—U. S. Army Cold Storage Plant, San Francisco.

Below—Wall coils in a double bank of wrought iron pipe refrigerate this cooler room in which condensed milk is stored—Kern County Ice & Cold Storage Co., Bakersfield, Calif.

sulation used there is more emphasis on protecting the inside surface against damage by contact with packages, trucks or anything else that will harm it.

Interest is being shown in what takes place within the insulation as months and years pass. Thermocouples are being installed within the insulation structure to keep track of future trends. A portable heat meter has been developed. It is being used for regular checking of the heat flow through insulation at different points very much like engineers utilize megohmers—to keep track of the trends in electrical insulation in the plant.

Refrigeration Application

The application of refrigeration in the warehouse continues to feature those long time contests: pipe coils vs. unit coolers and brine vs. ammonia. In the case of the former, however, the contest is on a modernized basis. Forty years ago competition was between room coils and stacks of pipes in a separate enclosure with blowers to circulate the chilled air.

Welded assembly of pipe has long been taken for granted and the advantages it produced have little special attention. Lately, threadless couplings and fittings sealed by brazing have become available and will compete with welding. Steel pipe with cast aluminum fins is being used to reduce the weight and save on space occupied by room coils. New types of plate coils are also creating interest.

Better designs of direct expansion coils have improved operations from the standpoint of relative humidity maintained and have reduced the total pipe surface to some extent. These are flooded type coils with welded headers of larger size to reduce suction gas velocity. Some liquid ammonia recirculating systems have been installed in warehouses in this country. They include large liquid surge drums with liquid pumps to circulate an excess of refrigerant through the coils. More widely used overseas, they not only increase the duty of installed pipe surface but also aid in preventing oil accumulation in the coils.

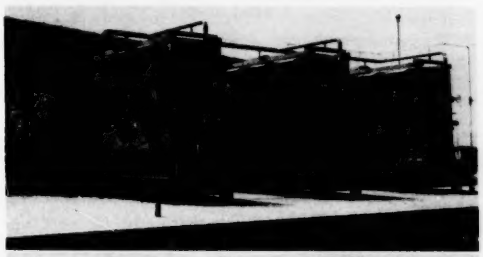
The matter of oil fouling of coil surface has received more attention recently. Better oils are being used and they are more easily removed. Some positive steps are also being taken to separate oil from the refrigerant before it is fed to the coils and improve operating results.

Brine vs Direct Expansion

The conversion of many cooler rooms to freezer service and the construction of additional freezer space during the past eight years expanded the use of direct expansion in refrigerated warehouses. Nevertheless, brine refrigeration systems continue to have their strong advocates and are being used in a number of locations. It is pointed out that a brine system is easier to control and the automatic controls encounter less difficulty under existing conditions. The brine partisans also point to the inherent stability of a brine system and feel that it is easier to avoid temperature fluctuations.

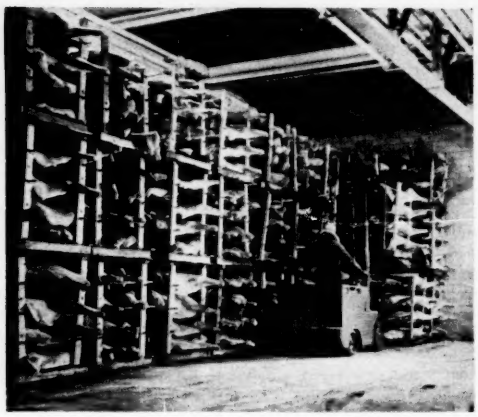
Automatic leak detection equipment can be applied to brine systems while no equivalent appliances are available for volatile refrigerant systems. These are some of the reasons why brine system users in the lower temperature range are content to assume the penalty of about 15 to 20 per cent in compressor capacity and 10 per cent additional power consumption involved in the lower suction pressure that results when a brine system is used.

Numerous methods are used to defrost room coils in refrigerated warehouses. When pipe was more plentiful, it appeared that rooms might be equipped with an extra set



Above—A bank of evaporative condensers on the roof of a cold storage plant combines the operations of evaporative water cooling and condensing—U. S. Army Cold Storage, Seattle, Washington.

Below—A neat combination of induced draft cooling tower and horizontal shell and tube condensers. The pumps have short suction connections and discharge through the condensers to the cooling tower—Modesto Refrigerating Co., Modesto, Calif.



Special racks on pallets, high piling space and fork trucks combine to permit rapid handling of these bulky quarters of beef in the freezer.—Alford Refrigerated Warehouses, Dallas, Tex.

of coils which could be utilized to allow frost to sublime but pipe scarcity and costs may eliminate this method. Hot gas defrosting is widely used in direct expansion coils. A number of warehouses have connections on their brine coil banks so that a cart of warm brine can be brought into the room and defrosting accomplished by pumping this brine through each section in turn.

Unit Coolers

The popularity of unit coolers continues to increase. They have less weight and take up less space. In addition they provide high velocity air for rapid chilling. Further they frequently involve a saving in both first costs and overall operating costs.

Methods of defrosting unit coolers are numerous. Many earlier designs included brine spray over the unit surface to increase refrigeration capacity and prevent accumulation of frost. More recently spray type units employing an anti-freeze solution which is constantly reconcentrated through a heat exchanger and evaporating system have been installed. Water defrost cooling units of two types are used, one type has installed connections to supply the water and drain it away from the units, while the other type have connections to utilize water from a portable tank and pump brought in occasionally to do the defrosting work.

Those who prefer coils in place of unit coolers point out that the units move a considerable volume of air at high velocity but this does not necessarily insure the desired circulation through the stored goods. Recent investigations in this field show the question to be valid but additional investigation may be necessary to prove that circulation from room coils is the complete answer to the needs of the situation.

Some designers compromise by utilizing unit coolers but provide duct distribution system to establish a more positive air circulating pattern in the storage room.

Relative Humidity

More attention has been given to control of relative humidity in both cooler and freezer rooms. While the relative humidity is principally affected by the difference in temperature between the general room air and the refrigerating surface, other factors have and deserve attention. These include the efficiency of the room insulation. From a drying effect standpoint other factors are introduced such as the air velocity over the goods, temperature stability and food packaging. It is sufficient to say that satisfactory conditions are being obtained with various types of equipment but studies continue with the purpose of bringing some light on the most desired combinations of relative humidity, air circulation, arrangement of the goods and its packaging.

Automatic Equipment

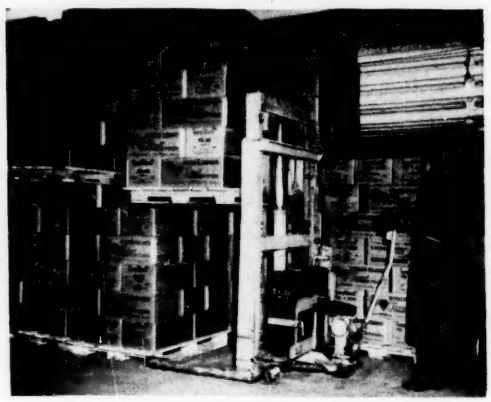
Semi-automatic plants have been installed but not widely and it appears the application of automatic equipment will proceed slowly on a partial basis modified, to some extent, by the size of the operation. In Europe remote reading thermometers are widely used to take temperatures in refrigerated rooms. Some such equipment is occasionally used in this country and a few plants are equipped with automatic temperature recorders. Most operators still prefer temperature men who read the thermometers and adjust the refrigeration, room by room.

Automatic temperature control on coils and unit coolers is widely utilized but anything like general application remains for the future. For brine systems there are self-operated type regulators as well as pneumatic and electric controls. It is generally considered the brine controls operate on smaller temperature differences than the controls utilized on direct expansion systems, but users of the latter report rather close temperature control of some systems by this means.

Condensing Equipment

The trend in refrigeration condensing equipment has narrowed to shell and tube condensers and evaporative condensers. The former, of course, require a cold water source or a cooling tower to re-cool the water. Evaporative condensers have enjoyed increased popularity during the past few years because they combine the cooling tower and condensing operations in one unit and require very much less space. Where water conditions are bad and the water supply has a rather high concentration of minerals, the shell and tube condensers are favored.

Both types of condensers are benefitting from careful water treatment which reduces troubles from algae con-



Tiering frozen foods on pallets in a multi-floor warehouse. The compact fork truck with walking operator can be used in relatively narrow aisles and can be moved from floor to floor in low capacity elevators.—Merchants Refrigerating Co., New York City.

tamination, scale accumulation and excessive corrosion of condensing surfaces. Much more has been learned about effective methods of water treatment. In addition, plant operators have reduced their difficulties by paying more attention to regular blow-down of their condensing water systems to keep the mineral concentration within acceptable limits.

Sanitation and Air Purification

Well operated warehouses have always operated on the basis that good housekeeping avoids difficulties and pays dividends. Recent investigations on sanitation have only furnished additional corroboration of this view. Investigators have come back to the industry with evidence that good sanitation procedures involve care to avoid dirt and contamination, cleaning and scrubbing to eliminate dirt and the use of new sanitizing agents as an extra precaution to maintain sanitary conditions.

In Other Days —

They Sealed the Insulation

IN 1906 a new building for the storage of eggs was constructed in its Eastern Avenue group by the Quincy Market Cold Storage & Warehouse Co., Boston. The company expressed its intention to make this one million cu. ft. warehouse fireproof and durable. Contrary to methods previously used in similar structures, all wood construction was eliminated except in the outside door and window frames. Furthermore, they took unusual steps to insure against moisture deterioration of the rock wool insulation by sealing it in metal cans as described in ICE AND REFRIGERATION, February, 1906.

"The typical insulation is as follows, the materials being named in order from the outside to inside of wall: Twelve inches of salt glazed terra-cotta, made up of 8 in. and 4 in. blocks with broken joints; ½ in. Portland cement grout; galvanized sheet-iron cans, filled with best quality rock wool, and then hermetically sealed; ½ in. Portland cement grout; four inches salt glazed terra-cotta blocks."

The removal of odors and volatiles from air in warehouse rooms has had intensive investigation which continues. Two fundamental objectives are to eliminate odor transfer to goods that would be adversely affected and to provide a better general environment for stored goods. At first glance, the ideal conclusion for these investigations would seem to be the development of equipment which would adsorb all odors and permit mixing of various commodities in one room. Definitely such equipment is not in sight at the present time.

Progress has been made in the investigation of activated carbon air filters for several purposes. Scald control has been effected on certain varieties of apples at a cost which appears to be lower than other methods used for the same purpose. Too rapid maturing of some varieties of fruits has been retarded by air filtering and storage life promises to be lengthened. Undesirable odors have been removed from storage room air. Plant scale applications are proceeding to test these uses and investigate other factors such as the practical effect of various air circulating patterns and other aspects in the air purification picture.

Handling Goods

The war placed great emphasis on speeding the handling of goods in the plant and conserving scarce man-power. Later mounting labor costs also brought problems in the cost of handling goods. Meanwhile fork trucks and other mechanized equipment for rapid handling of goods with a minimum of man-power had been developed for application in other fields. The equipment was readily applicable to use in one or two floor refrigerated warehouses built with mechanized handling in mind. Not much of it had utility in the multi-floor warehouse constructed earlier.

Handling equipment manufacturers in consulting with warehouse people modified their designs and placed equipment on the market which does have utility in the older warehouses. Excellent compromises have been developed by materials handling engineers to utilize this equipment and apply partial mechanized handling in refrigerated warehouses of all types. Since this work is in its primary stages, it is logical to predict new designs in equipment and important refinements in methods during the next few years.

Safety and Accident Prevention

The handling of merchandise has a disarming simplicity about it. In addition, no single refrigerated warehouse has a really large number of employees as compared with large manufacturing or processing operations. Probably that is the reason the refrigerated warehouse industry is just beginning coordinated accident prevention work although organized National accident prevention in other industries has been going on for thirty-five years.

Individual refrigerated warehouse operations have been carrying on effective programs in safety and prevention of accidents. The industry, as a whole, however, is paying the penalty for a lack of a well-organized industry-wide program. The rate of personal injuries is considerably above that of a number of other industries which have been working on their problems. Now that the same remedial methods are being readied for application to the refrigerated warehouse industry, it can look forward to numerous benefits. These include reduced direct accident costs, lower insurance premiums, better employee relations, and the ability to attract more of the better types of men to their employment.

In Other Days –

They Discussed Consolidations for Governing Rates

AN INTERESTING sidelight on unrestricted business conditions of past yesterdays is shown in a short news item published in the December 1898 issue of ICE AND REFRIGERATION. At a warehousemen's convention in New York City, a committee was appointed to consider plans of consolidation or for forming an association to govern rates. The committee consisted of Samuel Bailey, Jr., of the Union Cold Storage Co., Pittsburgh, Pa.; Homer McDaniels, of the Cleveland Cold Storage Co., Cleveland, Ohio, and LeGrand Smith, of the Union Cold Storage Co. of Chicago. A preliminary meeting of the committee was held in Buffalo, but nothing definite accomplished. A further meeting of the committee was to be held later that month, the report stated, when it was expected that definite plans would be formulated. This, needless to say, was in the days before the advent of modern laws against combinations in restraint of trade.

The Officers—

Edgar M. Burns

Harlan J. Nissen

Arthur N. Otis

Association Directory — They Keep the Wheels Moving

President, N.A.R.W., Edgar M. Burns, Terminal Ice & Cold Storage Co., Portland, Ore.

President, A.W.A., Harlan J. Nissen, Terminal Refrigerating Co., Los Angeles, Calif.

Vice-president, Arthur N. Otis, Merchants Refrigerating Co., New York, N. Y.

Treasurer, Fred F. Alford, Alford Refrigerated Warehouses, Dallas, Tex.

Executive Vice-president, William Dalton, Washington, D. C.

Secretary, William M. O'Keefe, Washington, D. C.

Executive Committee

P. D. Burrill, Quincy Market Cold Storage & Warehouse Co., Boston, Mass.

Harry Foster, Cincinnati Terminal Warehouses, Cincinnati, Ohio.

J. L. Gagini, Omaha Cold Storage Co., Omaha, Nebr.

W. A. Kopke, Chicago Cold Storage, Chicago, Ill.

W. A. Moore, New Orleans Cold Storage & Warehouse Ltd., New Orleans, La.

H. J. Nissen, Terminal Refrigerating Co., Los Angeles, Calif.

A. L. O'Connor, Artesian Ice & Cold Storage Co., St. Joseph, Mo.

E. E. Seymour, United States Warehouse Co., Detroit, Mich.

H. W. Wilson, Quaker City Cold Storage Co., Philadelphia, Pa.

Committee Chairman

Safety: A. R. Shepherd, Chicago, Ill.
Banking: H. W. Wilson, Philadelphia, Pa.
Legislation: J. P. Johnson, Washington, D. C.
Insurance: Richard Klinck, New York, N. Y.
Pacer: Garth Shoemaker, Elmira, N. Y.
Costs: E. E. Hesse, Chicago, Ill.

Chapter Directory

NORTH ATLANTIC CHAPTER

H. C. Emerson, chairman, Bridgeton, N. J.

C. B. Eddy, secy., Merchants Cold Storage & Warehouse Co., Providence, R. I.

GREAT LAKES CHAPTER

A. B. Efroymson, chairman, Cleveland 13, Ohio.

P. G. Kuehn, secy., The Wisconsin Cold Storage Co., Milwaukee 4, Wis.

SOUTHEASTERN CHAPTER

T. E. McCrary, chairman, Memphis, Tenn.

C. A. Martin, Jr., secy., Polar Cold Storage, Nashville, Tenn.

SOUTHWESTERN CHAPTER

J. K. Dozier, chairman, Houston, Tex.

D. A. Laird, secy., Texas Creamery Cold Storage Co., Houston, Tex.

SOUTH PACIFIC CHAPTER

Ludvig Ubbe, chairman, Los Angeles 13, Calif.

Leon A. Bailey, secy., Pacific States Cold Storage Warehousemen's Assn., San Francisco, Calif.

NORTH PACIFIC CHAPTER

J. R. Goodfellow, chairman, Seattle, Wash.

E. F. Swanberg, secy., Diamond Ice & Storage Co., Seattle, Wash.

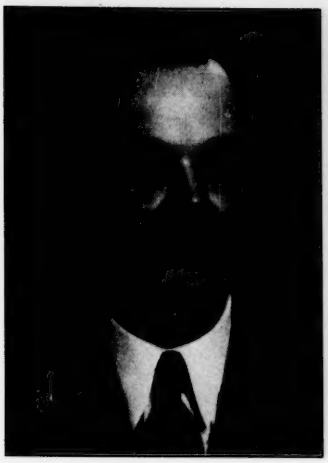
MISSOURI VALLEY CHAPTER

F. D. Newell, Jr., chairman, Minneapolis, Minn.

A. F. Versen, secy., Security Bldg., St. Louis, Mo.

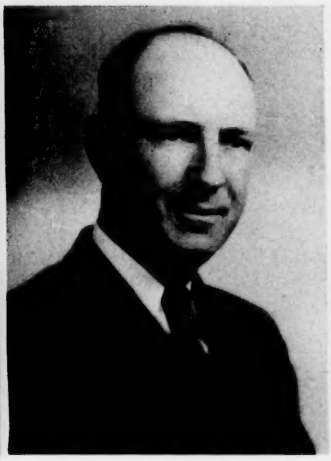
Refrigeration Research Foundation

Chairman of Board, Dr. Samuel C. Prescott, Boston, Mass.
President, Vallee O. Appel, Chicago, Ill.
Vice-President, Arthur N. Otis, New York, N. Y.
Treasurer, Wm. A. Sizer, Chicago, Ill.
Secretary-Director, H. C. Diehl, Berkeley, Calif.



Fred F. Alford

William Dalton

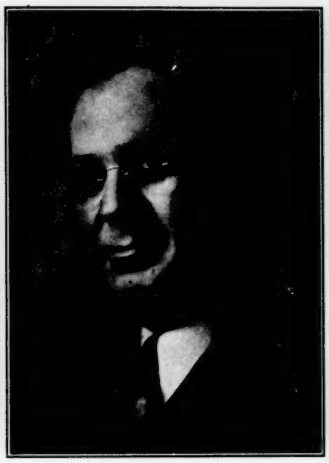


William M. O'Keefe

Office Views, Home of the National Association of Refrigerated Warehouses

(1) Wm. Dalton, Executive vice-president; (2) Jos. H. Colquitt, assistant to executive vice-president; (3) Wm. M. O'Keefe, Secretary; (4) Conference Room; (5) The Tower Building, Washington, D. C.; (6) Reception Hall; (7) Mary Latka; (8) Jean Moeller; (9) Lucille Temple, Administrative Assistant; (10) Celia Green; (11) The multigraphing room.

P. D. Burrill



Harry Foster

J. L. Gagini

Messages from Headquarters—To Refrigerated Warehousemen

What the National Association Means to Refrigerated Warehousemen

By Edgar M. Burns,

President, National Association of Refrigerated Warehouses

IN THE first place what are the stated objections of the association as laid down in our charter? Let me quote:

The objects for which the Association was formed, as set out in its Certificate of Incorporation, are:

"To advance the interest and welfare of the refrigerated warehouse business, elevate and improve its standards and promote a better understanding within the industry and among the general public of its problems; to conduct research upon ways and means of lowering the costs of operation without lessening the service rendered; to provide a form for the collection and dissemination of statistical information and the exchange of ideas among its members; to advise members of legislation and regulations affecting the business; to improve the relations between employers and employees; to support governmental authorities and agencies in the maintenance of fair trade and competition; to cooperate in the development and work of sectional, state, and local organizations of refrigerated warehouses and other organizations whose members are engaged in similar or related lines of business."

Simply stated we work together for our common good on all questions that can legitimately be so considered, and they are many.

For years the industry was simply "Cold Storage warehouses"—now we realize that there is a technique to the proper handling and treatment of the goods placed in our care. We have the responsibility of being trustees of perishable foods. But not one of us knows it all—through the association we exchange ideas as to methods and find means of comparing our services—while still maintaining our competitive position. We believe that the passing along of our experience while helpful to others—is beneficial to the industry at large—and the former curse of the "Cold Storage" label can thus be outdated and that through the association meetings and exchange of ideas through the term "Cold Storage" is becoming a label of distinct approval.

We have the tremendous problems of proper consideration to our industry in legislation—no individual could possibly get proper consideration—every territory must be considered—and through the Association every territory is being considered.

The matter of Departmental Regulations can only be fairly represented through a national viewpoint and thus becomes the duty of the National Association.

All representations require support by statistical information—and such information can only be intelligently collected and presented through a national group.

If at any time problems of "universal" application are to be faced—what other approaches to these questions are available at such a small cost and with so little labor to the Individual?

One might go on indefinitely on such a topic, but a National Association is a vital necessity to all industry, and the individual-operator is also a prime necessity as an active member of the Association.

Remember what Kipling wrote of The Law of the Jungle?

"The strength of the pack is the wolf—
And the strength of the wolf—is the Pack."

Why All Refrigerated Warehousemen Should Be At San Francisco

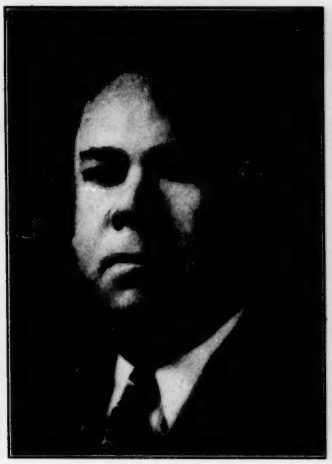
By William Dalton

Executive Vice-president, National Association of Refrigerated Warehouses

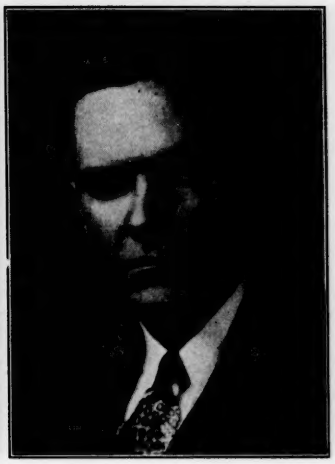
YOU and I have seen a lot of conventions — everybody has, where it is either too much of this or too little of that; where the program was long and draggy; where the sightseeing was not worth a hoot. We have both experienced meetings where we started yawning after the first presentation and where we couldn't wait to get out for a breath of good, fresh air.

Then we have experienced these get-togethers where the convention committee has had to go all out for the visiting delegates. They've wanted to provide the most scrumptious pinpoint attack on every waking hour of the

W. A. Kopke



W. A. Moore



A. L. O'Connor

poor conventioneer, have run him ragged all over the place with a quick look at statues of the Saints of Sin and a long drive through the wooded wonderland of warping willows.

Maybe some folks like that sort of thing; maybe they go to a convention to be bored or get exhausted so their return home will be such a pleasant event they never want to roam away again. But not the members of this Association.

Here's what our people want: Short, well planned sessions full of the meat of the cocoanut—stuff they can take home with them and use in their every day business. They want both entertaining and relaxing features and special events—with enough time off in between for a little cat nap or a sightseeing tour all of their own.

However, they also want enough organized activity so they won't miss the highlight offerings of the convention city; so they can go home and say, for instance, "Sure I saw San Francisco's famed Chinatown"; "I saw the city and the Bay from the Top of the Mark" or "I made the Bay cruise on a chartered boat and saw the works, including Alcatraz, the Golden Gate Bridge, the fog over Telegraph Hill, etc."

Why should every member of the American Warehousemen's Association be in San Francisco February 7-10? Why it's a natural spot for all of these things we are talking about. Never was a convention city so appropriately chosen; so outstanding in its many offerings to visitors as San Francisco in 1949. The holiday atmosphere prevails all over the place. The spirit of our forefathers who either trekked out there in '49—or who wished they had—pops out all over the area. The people on Nob Hill have put aside their lorgnettes and joined in the spirit of that city's greatest celebration. The cable cars even clang with a tune which resembles the "fox-trot welcome."

Yes, all of these things are attractions; they all go to make up the usual convention fanfare and procedure.

But—there is something even more important.

February of 1949 will complete another year during which we have seen some interesting and unusual developments in our industry. We have observed technical advancements, operating improvements and new ideas entering the warehouse picture constantly. We have even seen new philosophies of business, of governmental and of economic freedom develop amazingly during that year.

All of these things are concerns of not only you and me, but they are items which should regularly be on the calanders of interest of every sound thinking and progressive minded individual in our modern economy.

Our members can expect to sink their teeth into a bushel of ideas in San Francisco. They can expect to take home with them information, practices and facts which they can apply to their own firm's operations—and which should mean dollars in the pants pockets.

Sure, we are planning big things in San Francisco, we are planning on record attendance, too. The AWA special, which leaves Chicago on February 2, will chug out of the station with a trainload of eager pioneers of '49 (1949 that is). It is going to be a great trip. See you in San Francisco.

Why We Are Going to San Francisco

From Other Members of the Official Family

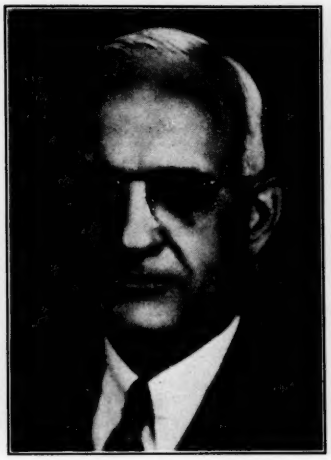
● Although I missed the last one I do definitely expect to be among those present at the AWA-NARW Meeting in San Francisco next month. It has been my privilege to attend all but two of the national warehousing conventions in the past twenty years and my observation following every such conclave has been a degree of improvement in the industry's services, expansion of facility, adoption of modern methods and equipment in plant operation, greater technique in the handling, storage and preservation of merchandise, application of research, greater unity within the industry and other progressive developments, which in the aggregate over the past two decades have brought the Commercial Warehousing Industry to the forefront in American business.

As a result, the distribution system in this country has benefited materially, and the general public has been better served in each successive year. Producers, processors, manufacturers, transportation agencies, brokers, distributors, retailers and consumers—in fact, all of America—have benefited by this great progress in public warehousing service, and there will come more and greater developments in the public interest from deliberations of the industry's executives in convention assembled at San Francisco, February 7-10.

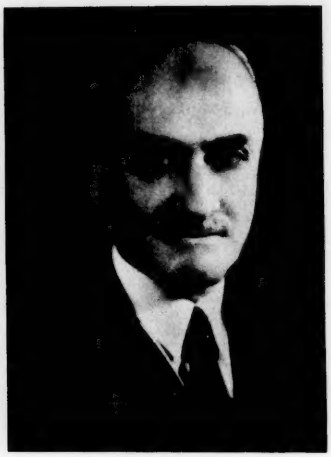
Attendance at all such gatherings is priceless and, in my judgment, no public warehouseman can very well afford to pass up the forthcoming convention on the West Coast.—

WM. M. O'KEEFE,
Secretary, National Association
of Refrigerated Warehouses

E. E. Seymour



Horace Wilson



Vallee Appel

● I am going to be a "49er" because our convention is always interesting and worthwhile. Feeling as I do about our association and its convention, the place chosen adds another attraction. I surely don't want to miss this one. With the return to a more normal business period, we warehousemen must be on our toes. Our program is designed to provide stimulus to this end. The place, the program, the chance to renew acquaintances with friends in the industry, makes it a "must" to be a "49er." — P. D. BURRILL, Boston, Mass.

● My reason for going to San Francisco is simple. I am going there to learn what I can about merchandising refrigerated warehouse space. In practically every industry nowadays, the buyer is relaxing a little more — the seller is working harder. That makes the Merchandising theme a pretty important one in our industry, and I am anticipating an opportunity for the acquirement of new ideas, new angles—many of which I can bring home with me and use in our every day operations. It is going to be a great convention. See you in San Francisco. E. E. SEYMOUR, Detroit, Mich.

● Advance notices promise that the February '49'er Convention will eclipse all previous meetings of the refrigerated warehousing industry. I am going with the intention of receiving the full benefits of the sessions and to contribute in a modest way my part in making the convention an outstanding success. I have attended many of these conventions in the past and have always enjoyed the relaxation of new surroundings; the inspiration and enthusiasm for the industry engendered by association with fellow warehousemen from all sections of the country; large and small operators whose problems and aspirations are identical with my own. I am confident I will again return from the '49 Convention well satisfied my time, money and effort have been well spent, and represent an investment which will produce dividends in better warehousing throughout the coming year.—A. L. O'CONNOR, St. Joseph, Mo.

● The proper aim for management of any business is a well-rounded program which will be of overall benefit to customers, stockholders and the staff of that business. To this end, the N.A.R.W. 1949 convention will be considering how to give better service to customers and still render a fair return to stockholders, after taking into consideration the welfare of employees and the maintenance of properties at a level which will insure good service.—A. N. OTIS, New York, N. Y.

● The concerted effort of all warehousemen is necessary for the perpetuation of our industry in these inflated times when chaotic financial stresses are upon us. Now that "problems" are creeping into our daily routines as warehousemen, where else will they be better aired than at the AWA Convention in San Francisco?—BILL BAKER, Chicago, Ill.

In Other Days

Early Pipe Line Refrigeration

ONE of the side lines developed by the early cold storage industry was that of supplying refrigeration by underground pipes from a central station. A pioneer in this work was the St. Louis Automatic Refrigerating Co., St. Louis, Mo., an ancestor of the present St. Louis Refrigerating and Cold Storage Co.

An article in ICE AND REFRIGERATION July, 1891, states that this service had passed its experimental stage and was firmly fixed as a commercial enterprise. The first pipe line established, according to this article, was in Denver, Colo., installed in the spring of 1889. About a mile and a half of street mains were being operated at that point, the principal customers being butchers, hotels, restaurants, saloons and commission houses.

The first line in St. Louis was put in operation in May, 1890, and soon after installed, the business increased quite rapidly. Incidentally this system is still being operated by the St. Louis concern under a general franchise obtained from the city council in 1890. About a mile of street mains were laid that year.

In constructing the street lines, a half section of 12 in. vitrified pipe was first laid in the trench, solidly imbedded in a concrete base. The wrought iron piping carrying the refrigerating agent was then laid on specially prepared saddles in this half formed conduit. After the piping had been thoroughly tested for leaks, the other half, or top section, was laid on. A projecting lip was molded on the edge of the lower half section of pipe, and when the top section was laid on, soft liquid cement was poured along the upper side of this lip, making a water tight joint. The joints between each length of vitrified pipe was also carefully cemented, so that when the work was completed, the entire piping system was inclosed in a water tight conduit.

The Refrigeration Research Foundation —Its Accomplishments and Future Plans

By Vallee O. Appel
President, The Refrigeration Research Foundation

GENERALLY speaking, objectives in organized scientific research endeavor may be classified in character as remote and immediate. In our specialized field of research the overall remote objectives are in the main: 1. A better nourished nation through the preservation of more of the less stable nutritive factors in foods, and 2. Improved national health of our people through the better control of deteriorative processes affecting foods we consume. These objectives are sound and practical. None may gainsay that an expanded and more intelligent use of refrigeration of foods will contribute vastly to the attainment of these laudable objectives.

Immediate objectives are multiple and can be made specific when and if the resources at our command may permit. Generalizing again, immediate objectives of our research endeavor include: 1. a larger share of perishables protected by controlled temperatures. 2. A better utilization of refrigeration—earlier application for many perishable commodities and a more consistent application throughout the entire system of distribution with particular emphasis on warehousing. 3. Solution of technical and practical problems resulting in improved methods and practices. 4. Greater efficiency in strictly warehouse operation.

These objectives—remote and immediate—were envisioned by the Foundation's original sponsors five years ago; these objectives have since been diligently pursued by our Director, the Scientific Advisory Council and the governing industry members of the Foundation.

The establishment of grants in aid to leading universities and colleges for specific problems of research has been and continues to be one of the main functions of the Foundation. Selection of the institution and scientific personnel best equipped for a particular task is of prime importance, requiring time, study, and informative data on the part of the Director and Advisory Council. Projects covered by these grants may be roughly classified in three groups: Frozen Products, Cooler Products. Basic Engineering and Management.

Frozen Products

Projects covering these products consist of three on meat at Kansas State College, one each on poultry at Iowa State, eggs at Ohio State, pre-cooked foods at Massachusetts Institute of Technology, fruit juices at University of California and shrimps at Louisiana State University.

We learn from the Iowa State project that where eviscerated poultry is concerned, packaging and storage temperature are definitely closely related, that the better the packaging the less necessary it is to store at the lower ranges of temperature. In addition, we also obtain from this project reliable data on many other factors involving quality as affected by storage. The Ohio State experiments have developed valuable information relative to the freezing rates for liquid eggs under various conditions and their relationship to quality and bacterial content. At Louisiana State University, we have developed the major causes of deterioration from the time shrimp are caught until they are frozen and stored. The M. I. T. project gave to us the nature and extent of danger from bacterial contamination in pre-cooked frozen foods. Additional data was obtained at the University of California on frozen juice packs and the assurance that good packs of this product are possible. At Kansas State we are succeeding in removing doubts as to the best means for handling frozen meats.

All that we have learned from each and all these projects is basically necessary in our progress onward in the art of preservation of food by freezing. Undoubtedly, scientific investigation of this character serves as a guide in defining exact standards and, for individuals and the industry, adds greatly to our lore of technical knowledge in caring for the nation's food.

Cooler Products

Projects on the preservation and storage of apples have been undertaken at Cornell University, Iowa State, and Rhode Island State College, on dried fruits by the U. S. Department of Agriculture at Fresno, on tropical fruits at U. C. L. A., on potatoes at the University of Nebraska, on vegetables at the University of California. Here again the industry has acquired a fund of valuable information, all of inestimable usefulness in the understanding of technical factors in the maintenance of quality.

Important to all of us is the information developed at Cornell University on the removal of volatile gases and odors from the air in storage rooms, particularly through the use of activated carbon. Two new projects on atmosphere purification, one at Purdue University, the other at the State College of Washington are in progress. These later projects are primarily concerned with the practical installation and extension of usefulness of activated carbon in air purification. The success of these projects bids fair to improve the quality of stored commodities and to make available for warehousemen the use of additional storage space.

It has been definitely demonstrated through our research efforts that dried fruits should be kept in refrigerated warehouses continuously at a controlled temperature. This fact having been established we owe it to ourselves and to our customers to spread the gospel.

On other projects involving cooler products, we have secured varying amounts of more precise data than we possessed in the past—as examples, in the matter of transpiration in stored apples as related to air movement, the protection of vitamin C in potatoes, the causes of spoilage in lemons and the use of carbon dioxide gas in our difficult battle with apple scald and with rodents.

At the Massachusetts Institute of Technology a study of present and future applications of refrigeration was begun in 1947 and is continuing for a period of years. This project is well planned and promises to be of definite value to the industry. Similarly, a project on the refrigeration of peanuts at the Georgia Agricultural Experiment Station has explored the possibilities for increased cold storage of that commodity. Presently it is indicated

that this project when completed will serve the peanut industry and our own to an extent similar to the experiments conducted on dried fruits. A highly important project in which the Foundation is participating with the U. S. Department of Agriculture is that the storage of citrus fruits from Florida and Texas during the summer months when the demand for these fruits is at its peak.

At the University of Minnesota the Foundation is aiding in a project relating to the physical stability of frozen milk. Frozen milk is another potentially large volume product, and the problem seems to be within the range of solution providing we can put enough research power behind it. In this project our Foundation is actively collaborating with the milk industry and in a solution of the problems involved that industry and our own may richly gain. Where benefits accrue to both it is the desire of the Foundation to encourage joint participation in research.

As an aid in solving practical problems in a short time, the Foundation has ear-marked funds to meet the cost of short term investigations at Iowa State College, Massachusetts Institute of Technology, Oregon State College, Purdue University, University of Texas and Texas Agricultural Exepriment Station.

Basic Engineering and Management

Projects under this heading include the sanitation study at Michigan State, the psychrometry at Northwestern University, heat-transfer measurements at Columbia University, specified-heat studies on refrigerated foods at Texas University, and mycostatic and bacteriostatic agents for refrigerated foods at Oregon State.

The sanitation study has helped us evaluate new methods of sanitizing our plants. The Columbia studies on use of the electrical analogue in measuring heat transfer have given refrigeration engineers a valuable new tool. The specific-heat studies are arriving at basic problems in estimation of heat load in storages. The project at Oregon State is evaluating agents that might prove useful in our effort to prevent spoilage of fresh produce.

Foundation leaders engage in many other activities designed to improve the standards of our industry. In various sections of the country the Foundation during the past two years has conducted nine training and discussion conferences at which well-qualified industrial and professional specialists have appeared on the programs. Several hundred storage plant operating personnel and personnel from the Armed Forces have attended these conferences to their benefit. The results of the discussions are definite in effect and far-reaching in possibilities, thereby contributing to our growing fund of technical knowledge and to the assurance of better plant operation.

Director Diehl has been assiduous in collecting, compiling and organizing information from all sources relating to the field of refrigerated storage. This information in digested form is systematically sent to members in a mimeographed monthly bulletin or in reprints and sheets suitable for filing. The accumulation of this data for future reference and its dissemination to industry members is no small portion of the constructive work of the Foundation. The store house of technical information grows steadily larger with time and, undoubtedly, shall prove an invaluable future asset to the industry.

A worthwhile activity of the Foundation is its participation through Director Diehl and others in National Research planning as members of the Cold Storage Advisory Committee under the Research and Marketing Act of 1946. Diehl serves as vice-chairman of that committee and has brought his experience in the Foundation to bear on the recommendations made by the Committee. In a like manner the Director has been called upon in an advisory capacity concerning problems in the planning of refrigerating research of State Agricultural Experiment Stations. It is worthy of note that our Director has recently been selected as a consultant to the Western Regional Laboratory of the Department of Agriculture, a very worthy relationship in fostering and implementing our research endeavors in food and storage.

A more recent development in the Foundation's activities is the exchange of facts and opinions between ourselves and technical leaders in industries intimately related to our own such as the meat, poultry, fruit, vegetable, dairy and other industries.

All of which adds up to the inevitable conclusion that the Foundation and those responsible for its welfare have been extremely active, ever alert and fully conscious of their duty to an important industry. The Foundation has fully justified its creation. Future planning necessarily depends entirely upon the support of the industry which it serves. That support in my opinion is mandatory if the refrigerated warehouse industry desires to keep in step with its fellow industries in progressive development.

Research Means a Better Industry Job

By A. N. Otis

Vice-president, National Association of Refrigerated Warehouses

BY THE establishment of the Refrigeration Research Foundation, the refrigerated warehousing industry made its most progressive step in many years. Through a most able director, H. C. Diehl, the investment in the Foundation has enlisted the services of the best scientists in food technology, to find additional commodities which will be better preserved by refrigeration. In other words, The Refrigeration Research Foundation means for the industry more business eventually and gradually.

A large percentage of the Foundation's projects, under way at different universities, seeks to find the most desirable temperature, humidity, and other storage conditions for various commodities already regularly stored in refrigerated warehouses from season of plenty to season of scarcity.

The Refrigeration Research Foundation means the industry has helped to make possible a better job done. It means effort in the scientific field to supplement the practical experience and efforts of cold storage men. It puts to work scientists outside of the industry—not involved in either management or daily routine—for the public good and the good of the industry. It means industry recognizes and has acted upon its responsibility to the public. It has enabled industry to find out why commodities grown under such conditions, in certain soil, and shipped or packed under certain conditions do not remain of sound quality in refrigerated storage. It has helped warehouses, as well as growers and shippers, to cut losses by not attempting to store such products and not to repeat a mistake once the scientific facts are known.

In short, The Refrigeration Research Foundation means that, collectively, the refrigerated warehousing members, who give their time, thought and financial support to the Foundation, have been able to set up for each member, the equivalent of a research division which no one company could approach doing so well or so economically. Thus, by making available the latest technical storage development to safeguard the nation's food supply, the public welfare is greatly benefited.

The work of the Foundation is a long range plan and process, but it means progress for the refrigerated warehousing industry.

What Refrigeration Research Has Meant To The Meat Packing Industry

By Henry D. Tefft
Director, American Meat Institute

DEHYDRATION, salting and chilling are the three basic methods of preserving meat, dehydration and salting being the oldest. One example of dehydration is jerky or dried carcass beef as prepared by natives in dry climates. A more modern example is dry sausage. Salt pork is an example of preservation by means of salt. It may be of interest to note that the industry's designation "meat packing" arose from the practice of slaughtering hogs in cold weather and then packing the pork in barrels in strong salt brine as a method of storing it until wanted for consumption.

In recent years, the third method, chilling, has increased in importance. This change has occurred since the advent of mechanical refrigeration, which at first was confined to industrial installations, but more recently has been extended to home use.

The widespread use of refrigeration to protect meat all the way from the point of production to the point of use has enabled the meat packing industry to modify its procedures and to improve the palatability of its products because it has had to rely less upon dehydration and salt as a method of preservation.

Examples are the modern, tendered, mild-cured hams which have just enough salt to be flavorable and which depend upon refrigeration, rather than salt, for preservation. Other examples are some of the dry sausages which contain more moisture and are softer and which seem to meet the desires of the American public to a greater degree than the original drier and harder types.

Need for Research

These innovations in processing methods, however, have necessitated research for and development of better methods of refrigeration and closer control of temperatures, humidities and air circulation in the rooms where the processing is conducted. Without such close controls, it is impossible to maintain the original pleasing appearance and the quality of these milder processed products until they reach the consumer. In many instances manual controls have not been entirely satisfactory and automatic controls therefore have had to be developed.

The necessity for closer controls of air conditions has been one of the driving forces behind the search for the best methods of applying refrigeration to meat and meat products. In many instances, forced air circulation has replaced natural circulation. Much research work has been directed to the design of distribution ducts and air outlets so as to insure uniform air distribution throughout refrigerated rooms.

Newer types of evaporating surfaces, such as finned coils, also have been tried. These are particularly useful in rooms where the temperatures are maintained at about 38 F and where it is desirable to have high humidities. The small temperature difference between the evaporating refrigerant in such coils and the room being refrigerated aids in maintaining a high humidity. When adequate refrigerating surface is supplied, moisture, rather than frost, accumulates on the coils and the re-evaporation of this moisture tends also to keep the humidity high. The higher back pressure which can be used results in more efficient operation of the compressors. It is possible also to provide adequate evaporating surface without using excessive space in the refrigerated rooms.

One problem that has not been solved to the complete satisfaction of the industry is the corrosion of metallic surfaces which results from the use of salt brine as a refrigerating and defrosting medium. Many installations of finned coils do not require defrosting. A more expanded use of finned coils, therefore, may offer a partial answer to this problem of corrosion.

Research work by one of the larger salt companies has led to the development of a system that minimizes the loss of salt in brine wasted from brine spray refrigeration installations, while at the same time maintaining the brine at a strength predetermined as having the least possible drying effect.

Where defrosting is required, many types of defrosting devices have been developed to increase the efficiency of the evaporating surfaces and at the same time maintain temperatures within close tolerances. Back pressure valves also have been utilized for close control of temperatures and humidities.

Consumer Cuts of Fresh Meat

Another stimulus to search for better refrigeration methods has been the trend toward marketing meat in wholesale and consumer fabricated cuts rather than as carcasses. Meat marketed in this form has a greater surface exposure per unit of weight. This increased surface exposure, together with the nature of the surfaces, compels the use of more exact refrigeration methods in order to avoid deterioration of product. The increased handling necessary to prepare product as cuts and the use of packaging also raise refrigeration problems. An example is the sliced bacon packaging room where temperatures and humidities have to be closely controlled and in a manner to insure extreme sanitation.

Still greater problems arise when consumer cuts of fresh meat are frozen in packaged form. Considerable research has been devoted to the development of quick freezing methods applicable to the freezing of such fresh cuts at meat packing plants. The plate contact and air blast methods have been tried. Immersion in freezing liquids does not seem suitable for use with packaged meat. Birdseye belt and multiplate freezers are examples of the metal contact type, and the Frick Blizzard, of the air blast type.

The speed of freezing has been one of the deciding factors in the selection of the freezing method, because there is considerable evidence that the smaller the size of the ice crystals in the frozen meat, the more palatable it is, and also, the faster the freezing operation, the smaller will be the crystals.

There has been some lag recently in the interest in packaged frozen meat, due to the development of methods of self-service marketing of packaged fresh meat cuts, which have less sales resistance from the housewife.

The development of mechanical refrigeration has en-

abled packers to store meat in freezers when produced in excess of demand, at times of heavy livestock receipts, so as to have it available when demand exceeds current production. It should be emphasized, however, that such storage is not for the purpose of "hoarding," but serves the useful purpose of making more meat available during periods of shortage.

In order, however, for the product from the freezers to be equal in quality to fresh product, it has to be carefully protected by wrapping or packaging and then held at optimum temperatures and humidities.

Much research work has been carried on both by government agencies and private companies to determine optimum freezer temperatures which are at the same time practical and which will minimize shrinkage and development of rancidity and insure the retention of appearance and palatability. As a result of all this research, great advances have been made in the art of the cold storage of meat.

Trend Toward Lower Temperatures

The trend has been toward the use of lower temperatures than formerly, this being made economically possible through improved equipment design resulting from research conducted by the manufacturers.

One cause for inefficiency in low temperature rooms has been the accumulation of frost on the cooling surfaces. Consequently, a great amount of development work has been conducted on defrosting devices and systems which can be made operative in freezers.

One result of this study has been the increased use of forced air circulation over cooling surfaces, to replace cooling coils in freezers, and the use of natural air circulation. The cooling surfaces in these forced air circulation installations are kept defrosted by concentrated calcium chloride brine. A rather recent development has been a concentrator using electrical heat for maintaining the proper concentration of a special "no frost" liquid somewhat similar to the antifreeze used in automobile radiators.

Along with this development of defrosting systems has gone a study of the effect of extremely low temperatures during the initial chilling of the product upon shrinkage and upon subsequent accumulation of frost upon the cooling surfaces. This research work may ultimately result in the adoption of new methods of maintaining low temperatures in holding rooms.

Improved Refrigerating Equipment

The refrigeration equipment industry has designed newer methods of ice manufacture which are being installed by many meat packers because of the saving of floor space through their use and their adaptability to more convenient locations than the older type of tank ice equipment.

Research by the manufacturers of refrigeration equipment has led to the marketing in recent years of high speed compressors which require much less floor space than the older designs. This has enabled packers to increase their refrigeration capacity in many instances without an accompanying increase in the size of their compressor rooms. Centrifugal compressors also have proven advantageous in many cases.

Another development has been evaporative condensers which are extremely economical in the use of water. This hsa led to their use in localities where there is a shortage of water or where water is quite costly. Their selection has been encouraged in cities where the sewer systems have proved inadequate to handle an increasing load.

The meat packing industry has followed with interest the development of new types of insulation material. The ultimate in insulation would be one completely resistant to moisture penetration, entirely fire proof and rodent proof, and at the same time light in weight, reasonable in price and rigid in form.

Increasing appreciation of the role vitamins play in nutrition has caused some investigation of the effect of different methods of processing and of refrigerating meat and meat products upon their vitamin content.

The Importance Of Refrigeration In The Poultry And Egg Industry

By Cliff D. Carpenter
President, Institute of American Poultry Industries

EACH spring, an average of 34,000,000 chickens lay about 1,800,000,000 eggs which are bought as shell eggs and consumed in the fall and early winter months. First of all, these are eggs which are produced in surplus during late March, April, May and early June, since this is the period of time when most hens are in fullest production. This carry-over makes it possible for consumers to buy good eggs during this short supply season, at a reasonable price.

Another 23,040,000 chickens annually lay 3,456,000,000 eggs which will be consumed in cakes, candy, mayonnaise, noodles and other food products. These eggs are broken out and frozen and delivered to the various food trades in that form.

None of these normal marketing processes would be feasible were it not for modern refrigeration, both fixed and mobile. Since many of the larger centers of population are a thousand or more miles away from large areas of production, the problem of keeping eggs under proper low temperatures to protect their quality and guarantee higher consumer acceptance, sometimes months later, is solved by adequate refrigeration. Without this the producer might find it difficult to even "give away" his eggs during the peak production spring months and the consumer would pay an exorbitant price in the period of low production in the fall. Likewise, cakes, candy and other foods that require frozen eggs, would cost more. Refrigeration, then, becomes one of our industry's most important services.

Let's take a dozen eggs from an Iowa chicken house in April to a Chicago consumer's table in November. The eggs are gathered in a wire basket to permit free circulation of air and faster escape of animal heat (the eggs were over 100 F. when laid). After they are cooled out over

night in a cool, moist cellar, they are packaged in cool cases and soon they are in the processor's plant. Here they are candled, graded and put into a refrigerated room at about 55 F. and shortly thereafter taken to the local refrigerated warehouse.

Or, perhaps, when a carload has accumulated, they are hustled aboard a refrigerated truck or rail car and terminaled in a public warehouse in Chicago. There they are held at a constant temperature of just above freezing for several months—to be distributed to retailers and restaurants during the summer and fall. More and more, retailers are keeping eggs under refrigeration—both their backlog of supplies, as well as their retail displays.

All these processes involve cooling and refrigeration—and no eggs eaten yet—but wait a minute. They have one more refrigeration experience before breakfast time—the restaurant or home refrigerator.

Thus modern refrigeration helps provide a better market for the producer of poultry and eggs, brings the consumer a better product at a lower price and helps protect these foods from quality deterioration which conserves food and lessens waste costs.

What has been said about the importance of refrigeration to eggs is also true in the case of chickens, turkeys, ducks, geese, and other fowl. Refrigeration provides a fine balance wheel between supply and demand and the protection these perishable foods must have.

While many improvements can and will be made in refrigerating poultry and eggs perhaps the bigger job today is to make full use of the knowledge we now have.

Our industry might well toast the refrigeration industry for its past and present services and add "Here's to an even greater future for refrigeration—and to a fuller and better living."

What Research Means to the Warehousing Industry

By J. F. Meagher

Merchants Terminal Corp., Baltimore, Md.

THE theme of NARW's annual meeting in San Francisco, February 7-10, will be "Merchandising Refrigerated Warehousing." This thought-providing phrase causes me to ponder over a segment of cold storage operations that is all too often overlooked.

Present-day refrigeration research is providing a positive, increasingly effective approach to the many problems in the field of perishables, production and distribution. The modern refrigerated warehouse has become a veritable vault for health with the application of new refrigeration ideas and principles brought out by the modern magic of refrigeration research.

Only five years ago some of the leaders in the refrigerated warehouse industry—active in affairs of the National Association of Refrigerated Warehouses—gathered together to discuss a problem that has since been eliminated. The problem was simply termed, but represented a headache for cold storage operators; it was "how to develop new methods and new techniques in our industry to keep pace and ahead of progress in perishable marketing?" The answer was The Refrigeration Research Foundation.

The Purpose of the Foundation

The Foundation was organized primarily to develop and support a comprehensive program of research and education in the science and art of refrigeration of food and other commodities and to offer leadership and guidance to scientific developments in the refrigeration of such products.

The Foundation Research program deals primarily with behavior of commodities in refrigerated storage and the control of the storage environment which influences this behavior.

The Foundation functions also as a clearing house and repository of scientific information, useful to the Refrigerated Warehousing Industry. Primarily, the Foundation aids and influences research in established institutions and agencies especially qualified by reason of facilities, personnel and previous accomplishments by making funds available for investigations proposed by them or by the industry and which are worthy of financial aid. The Foundation program does not contemplate the establishment of research laboratories.

The purposes of the Foundation are as follows:

1.—Under the Directorship of Helmut Charles Diehl, it is improving the methods of refrigeration for the better preservation of food and other commodities essential to the health and welfare of the American people.

2.—It is developing and supporting research in the science and art of refrigeration of food and other commodities through a nationwide program of financial grants to establish institutions and agencies of research.

3.—It is establishing in the interest of the American people a repository of scientific information relating to the refrigeration of food and other materials.

4.—It is cooperating with and aiding agencies of Federal and State governments, institutions of research and others in connection with their scientific and educational work involving the refrigeration of food and other products.

Now, with five years of experience, our dream has come true. Now, with a dramatic background of experience and experiment, of rugged hard work, TRRF has made marked progress. It has indeed a record of accomplishment. Along with NARW, it is pointing the way towards improved efficiency, economics of operation, and merchandising—increased business for the industry by the simple application of new, tried and true discoveries.

Research in refrigeration has helped wondrously in the establishment of an outstanding feature of warehousing—"Reservoirs of the Nation's Health."

In Other Days

THE ammonia compressors, pumps and other equipment of the cold storage plants of early years look crude to us now. It should be realized, however, that these compressors were not only large but rugged and many ran for 40 or 50 years. They built for endurance in those days. Reading the literature of that period also brings appreciation of the fact that the early builders and operators were a progressive and inquiring group. They expressed interest in precise temperature control. They tried to provide proper control of relative humidity and to keep insulation dry and effective. While some of the theories they held have not stood up under further investigation the present day reader finds much that remains sound today among the writings of the pioneers in the industry.

Inter-Industry Responsibility

A Program for the Refrigerated Warehousing Industry

By Harlan J. Nissen

President American Warehousemens' Association

THE days of "Blessed Isolationism" are over. In fact, in industry they have been over for a long time. The origin of industrial trade associations in America dates back over 100 years when industry first banded together for mutual interest and mutual protection as early as 1766 when the Chamber of Commerce of the State of New York was founded.

With the impact of World War II, industry found added need for cooperation within itself, to interpret the many war controls and to have a voice with which to protect its existence under these controls. The need of organization for the interchange of technical information became evident as changes in manufacture and marketing processes were streamlined. Need for education within industry grew.

With the rapid increase and development of the perishable food industry, public refrigerated warehousing has assumed an increasingly important position in the flow of these perishables to market. As the industry developed, its services broadened, its functions increased and the need for interpretation of these services became more necessary. To this end, the industry through its National Association of Refrigerated Warehouses and the Refrigeration Research Foundation has sought counsel with allied trades and customer industries to work out mutual problems, iron out differences of opinion, and promote better understanding.

Let us observe for a moment the progress that has been made in this inter industry relationship.

Banking

Warehouse stocks are inventories. Without adequate financing, inventories cannot be carried. The use of warehouse receipts plays an important part in industry financing. The details of this use are not always understood, particularly by small banks and junior bank personnel.

Many years ago the American Warehousemen's Association, of which the National Association of Refrigerated Warehouses is a part, published a brochure — Warehouse Receipts as Collateral — acknowledged then as now as a hand book on the use of negotiable warehouse receipts for collateral purposes. This booklet has had broad use by banks and students for years.

A new brochure explaining the use of non negotiable warehouse receipts for collateral purposes is now being drafted by an industry committee representing both banks and warehouses. In order that the collateral value of perishables may be better understood NARW, during the last few years, has launched an active educational campaign. Warehousemen from coast to coast have appeared before State Banking Associations, local banking groups and credit associations, promoting a better understanding among bankers of the uses of warehouse receipts and educating junior bankers in this particular field of finance.

Transportation

Because it is important to the warehouseman that products offered for storage be in prime condition, the industry has a genuine concern as to the adequacy of refrigerated transportation. Products received at a warehouse in a damaged condition, thawed, or of questionable quality, become a serious operating problem. Should the damage be of a concealed nature, the problem turns into a real hazard, and a potential claim to the receiving warehouse.

NARW is cooperating with the American Association of Railroads in a campaign to reduce egg damage during transportation. Claims in connection with this particular product have been heavy. Individual warehouses also have cooperated with refrigerator car companies on test and experimental runs on the movement of frozen foods in an effort to solve the problems in this field.

Developments in the transportation of perishable foods over long distances by truck in the last two years have been spectacular. Many trucks were ill equipped; operators and drivers were novices in the handling of perishables. Drawing from industry experience NARW published and distributed to perishable food truckers a letter containing helpful hints, setting forth minimum requirements necessary for the proper transportation of perishables. Following this we were invited to appear before the Service and Equipment Division of the American Trucking Association at their annual meeting in Denver. A more active participation by the American Trucking Association in the problems of the refrigerated trucker resulted therefrom.

It is self evident that claims increase the cost of marketing. It is part of our responsibility to help eliminate this waste. The proper handling of perishables is our business! Dissemination of that knowledge is our responsibility!

Packaging

Practical discussion groups at annual meetings have long pondered over handling costs. These discussions developed the fact that many of the industry problems arose over packaging. Types of packages, size of packages, weights of packages, packing materials, slack packages, and inadequate containers, were named as causes of increasing handling costs. Here then was a new field of mutual interest, a field where a better understanding of our problems should be brought to the attention of packaging experts. Time studies proved that the handling of packages over or under a convenient size was costly, that improved package design could reduce warehousing costs and therefore ultimately reduce rates. Problems of the packaging engineer do not end with the completed container. They do not end until the product is delivered to the consumer.

Our Association was invited to appear before the Packaging Institute of America. A frank discussion of mutual problems both from the viewpoint of refrigerated and merchandise warehousemen developed a better understanding, on the part of the packaging industry, of the inter industry requirements. The entire food industry will benefit from the interchange of information at this level!

Customer Industries

Many of us can remember when the negative implication of "cold storage" was taken for granted. In the earlier days our industry was like Topsy—it just grew—. Food offered

for storage was "the left overs"—not always prime quality. As the packer and merchant of perishable food became more cognizant of the value of refrigerated storage, these practices changed. It became uneconomic to store junk. Standards of quality for stored products were raised. The Chicago Mercantile Exchange within the past months has raised the future board, egg quality standards. This is a concrete example of the trend toward higher standards, in quality of food offered for storage.

Under the guidance of the Refrigeration Research Foundation, over 20 research projects related to food preservation are being actively pursued. The successful completion of these projects will be of direct benefit to our customer industries. This represents a broad type of industry service and is mutually beneficial.

There is probably no single industry that is more important to the refrigerated warehousemen of America today than the frozen food industry. It might likewise be said that we are equally important to them. Here is an industry that cannot exist without refrigerated space of zero or colder. This industry, still in its infancy, has had its financing problems. Study on this subject proves that heavy investment of fixed capital assets is one of the most frequent causes of financial disaster.

The public refrigerated warehousing industry with its seasonal and geographic flexibility answers this problem, quite completely. As brand names become fewer and as production areas widen, problems of distribution become more complex. Public refrigerated warehouses, with transit privileges and ease of access from and to strategic markets, offer a flexible answer to the distribution of perishable commodities. The National Association of Frozen Food Packers, recognizing this mutuality of interest, has invited NARW to appear at each of its national conventions. Joint industry committees work well together to solve problems of common intereset and common concern.

The platform appearance of industry spokesmen at conventions of the International Apple Shippers, the National Poultry and Egg Association, and the Poultry Fact Finding Conferences, are further testimony of the sincerity of purpose with which the industry concerns itself with the problems of correlated industries.

Invariably, the better folks know each other, the better folks like each other. A family is a better family when it discusses its mutual problems honestly and objectively. A community that faces its common problems on a level of a frank and honest understanding, is a better community. Were the world able to sit around a table and unselfishly work out its common problems, the zenith of idealism would have been reached.

The National Association of Refrigerated Warehouses seeks to lessen the problems of its member companies by just this kind of human approach. It bespeaks the earnest cooperation of each of its members at the local level. Much is to be gained not only in dollars but in better service through a better understanding of the needs of allied industries and the widening of personal relationships that make for a more pleasant business day. The expansion and furtherance of this activity is worthy of the best efforts of the warehousing industry—

Yes—of all industry!

How to Establish an Effective

Employee Training and Education Program

By A. F. Winston
Beatrice Foods Co., Chicago

The recommendations of Al Winston on employee training and education are drawn from his experience in planning and placing an effective program in operation. The extensive manual he prepared as a basic part of the program for some time has been distributed to all company employees. It has created interest and attention because of its merit and many are convinced that widespread activity of this nature would bring substantial benefits to the industry. This article is a brief summary of tested methods which have proved effective in practice.

BUSINESS men today realize the importance of public relations, especially those connected with the refrigerated warehouse industry, but, strangely enough, too many of us seem to have disregarded employee training and education. A good training and education program is good internal public relations, and the value of it has been widely demonstrated in numerous industries.

The extent of a program you wish to set up depends a great deal on the size of your cold storage operation. Whether your plant is large or small, however, the end result of a well planned program will be better understanding. This means there will not only be better understanding in the sense that your employees will know more of their own particular job and how their job fits into the overall picture, but also it means that there will be better understanding in the sense of genuine employee loyalty and confidence in you and indirectly in the economic system they and you make possible.

Value of Experience

There is no substitute for actual experience in doing a particular job, but, there are a number of worth-while short cuts and aids which can be effectively used in conjunction with actual experience on the job. This fact was borne out during the war, perhaps most dramatically, when millions of men and women either in military or civilian life were called upon to perform a task which was entirely unfamiliar to them. By means of demonstrations, movies, short comprehensive courses, manuals, etc., many of these millions became trained in a hurry. The same can be true on a more modest scale in our industry.

What four short cuts and aids to actual experience would I suggest?

1. *Demonstrations.* Have your superintendent and foreman demonstrate how each job should be done. Some day movies will be used to augment these demonstrations as was done in the armed forces and in many industries during the war.

2. *Manuals.* Develop a manual for employees in which you state all rules and procedures but also share information about the business with your employees.

3. *Suggestion System.* By setting up a suggestion system which adequately compensates employees for suggestions, you will give them added incentive to learn their jobs.

4. *Safety And Accident Prevention Program.* You will save yourselves dollars as well as make your plant a safe place for you and your employees to work, if you develop a good safety and accident prevention program.

Now let us enlarge on the first two of these four suggested short cuts and aids to actual experience.

Demonstrations Learning through means of an example more or less speaks for itself. It should not be taken for granted, however, that your supervisory employees are taking care of this matter. You, as manager, should make sure every new man is shown what to do and how to do it. In slack seasons, your supervisory employees can find time to demonstrate to new employees such operations as: how to use new equipment, how to stack certain commodities, remove "snow" from coils, load and brace cars, ice cars, etc.

As already indicated in the outline above, training movies on all of these various phases of warehouse activity will some day be the accepted method of assisting new employees to learn their jobs, emphasizing warehouse procedures and safety precautions.

Manual The details of information and the methods of presentation in a employee manual, are, of course, a matter of opinion.

Introduced by Manager

Perhaps an introduction signed by the manager might be appropriate. This could be entitled "Because your Job is Important — we have prepared this manual. Your job is important because the cold storage industry is a vital link in the feeding of our nation. Food is grown and produced seasonally. It can not be consumed that way. It is consumed the year round. Food experts say that cold storage plants give good time and place utility. That means that we, in our cold storage plant, are charged with the responsibility of keeping food safe from spoilage — clean and fresh and ready to be passed on to the consumer.

"So yours is a position of trust and responsibility. You will want to know more about your job and how to do it better. You will want to know more about your company and your relationship and opportunities with the company. That is why this manual has been written for you. If there are any further questions, do not hesitate to consult with your supervisor or foreman.

"It is a pleasure to welcome you as a member of our organization."

A suggested index might include the following topics:

1.—*Background of Modern Cold Storage Warehousing.*

2.—*How has This Warehouse Performed an Important Function to the Community.*

3.—*The Advantages and Purpose of Public Warehouses Such As this One.*

4.—*Customers' Choice of Warehouse:* (a) Proper Location. (b) Has it facilities for handling and storing commodity in question. (c) Does it have adequate elevator, rail and trucking facilities.

5.—*The Purpose of Refrigeration.*

6.—*Greater use of Refrigeration in Marketing.*

7.—*Increase in Amount of Perishable Foods on The Market.*

8.—*Products Handled:* (a) List the freezer commodities generally stored. (b) List the cooler commodities generally stored. (c) Describe each of the above commodities as to how it is packed, how stacked and when it moves into and out of storage.

9.—*Commodities Which Are Hazardous to Storage:* (a) List these commodities. (b) State reason in each case, such as odor or difficulty in handling.

10.—*Warehouse Operating Procedure in Receiving Merchandise:* (a) Railroad Cars. (b) Trucks.

11.—*Warehouse Operating Procedure in shipping Merchandise:* (a) Railroad Cars. (b) Trucks.

12.—*Functions of The Traffic Department and Traffic Facilities.*

13.—*The Function of The Order and Stock Department.*

14.—*The Function of Solicitors or Service Representatives.*

15.—*Sanitation and Storage of Food:* (a) Give a list of twenty or more sanitation tips.

16.—*Safety:* (a) Give a list of some specific safety suggestions.

17.—*Management:* This should be a short discussion of the corporation set-up as to functions of Board of Directors, Officers, Stock Holders, etc.

18.—*Symbol of Service:* If you have a pin or some other form of service award, this might well be mentioned in the manual along with some other employee statistics.

19.—*Opportunity For Advancement:* A few paragraphs and statistics on your executives as to how they started would be in order. The implication would be that your employees today have a real opportunity for advancement.

20.—*Insurance Program:* If you have an insurance program, describe it.

21.—*Social Security:* Describe in a few short paragraphs the Social Security Program and who is eligible.

22.—*Workmen's Compensation:* State that, in conformation with the workmen's compensation law, the company carries insurance for all employees who suffer injury as a result of their work with the company. Suggest that all injuries, no matter how slight, be reported immediately, etc.

23-25.—*Employment, Lost and Found Articles, Causes for Discharge, General notice and General Instructions.*

26.—*A few definitions of words used in and around a cold storage warehouse. This can be an important section of the manual. Limit your definitions to about twenty. Such things as Warehouse Receipts, Car Bunkers, Lot Numbers, Car Seals, Use of Ice and Salt, Bracing, Buffing and Racking a Car, are the type of Definitions desirable.*

27.—*Rules:* This too is an important section of a manual as these rules should cover every phase of your operation. Make your rules short, sensible, and easily understood.

28.—*The Conclusion:* State that you hope that the reading of the manual has been helpful in obtaining an understanding of the company and its ways of doing things and then offer a challenge to each of the employees in regard to the future progress of the industry, indicating that it depends on them as well as you, and close with the statement "We welcome you as a member of our organization."

The last two of the four suggested short cuts and aids to actual experience — namely the suggestion system and a good safety program are of equal importance with the two others covered herein in some detail. One or both of them, however, have been covered in this or other issues of Ice and Refrigeration.

How We Like Refrigerated Foods

The Restaurant Industry Speaks

By Col. Paul Logan

National Restaurant Association

THE public feeding industry, operating through more than 500,000 establishments, does a twelve billion dollar business annually and ranks third among retail industries. Its service of sixty-five million meals per day provides America with about a quarter of all of the food that is consumed by our people. At least 80 cents out of every dollar spent by this huge industry for food supplies is for refrigerated, perishable items. Meat, poultry, dairy products, eggs, fish, fresh fruits and vegetables are the restaurant man's stock in trade. These constitute the raw materials for his manufacturing operation.

The importance of the refrigerated warehousing industry to the restaurant trade is emphasized by the fact that 80 cents out of every dollar spent for food supplies is for refrigerated, perishable items, says Col. Logan, who is thoroughly familiar with that trade. On the page following, the viewpoint of a leading home economist is expressed.

How does the restaurant man want these products? He wants them *fresh*. Freshness is defined, in part, by Webster as "newly produced, gathered, or made; hence, not stored or preserved" and "having its original qualities unimpaired: not stale, sour, or decayed; not faded, tarnished or the like." That is quite a mouthful.

What are the quality factors in these foods which the restaurant man would like to receive fresh and "having its original qualities unimpaired"? What determines quality in foodstuffs?

Quality Factors

Basically, of course, is genetic composition — variety. There is a great difference in flavor, color and texture of foods of the same species. One variety of apple is good for baking, another for fresh fruit use, another for general cooking, etc. Different varieties of potatoes are useful for different purposes. Dairy cattle differ greatly from beef cattle in conformation and finish. Both plants and animals are being developed into size, form, and composition best suited for consumer use, just as in the past they were developed for greater yield and disease resistance. One outstanding example of this is the large broad-breasted bronze turkey for institutional use and the small but heavy breasted white turkey for home use.

Quality of soil and climatic conditions are all-important to the quality of a product. If you want to know why certain regions of Kentucky are famous for fine race horses, study the soil conditions which make blue grass "blue"—the abundance of "bone-building" phosphorous.

Maturity is the next important factor. In fruits and vegetables maturity determines quality to a great degree. Most of the green succulent vegetables are harvested in their youth—while still immature and tender. Most fruits are harvested at full maturity when the sugar content is highest. Meats for the table are generally harvested young.

After a product is harvested, chemical and enzymic actions, incident to its growth, do not cease—they are in fact accelerated. When the life cycle is interrupted by harvest, deterioration starts. In some vegetables there is a rapid increase in starch, and toughness develops; the process is much slower in fruits; in meat the break-down of connective tissue (aging) improves quality up to a certain point. Regardless of storage conditions, unless the product is preserved by freezing or canning, these internal changes will eventually destroy its usefulness.

While these internal activities are taking place, the product is also beset externally by a multitude of micro-organisms. Molds, yeasts, and bacteria swarm over the product accelerating its break-down and decay. Some of the bacteria thrive in cold (32 to 50 F.); some grow best between 50 and 105 F.; while others love heat (105-180 F.). The majority operate and grow best between 43 and 113 F. Molds attack almost all foods that are exposed to air. They can grow only in the presence of oxygen and moisture. Yeasts cause fermentation—good in bread but bad in milk. In addition to enzymic activity and chemical changes, and to deterioration caused by micro-organisms, food loses quality because it has too much or too little moisture. Too much moisture brings about sogginess and speeds up the activities of micro-organisms, too little moisture causes withering and drying-out, with attendant loss of color and flavor; or because the product has too much or too little oxygen. Too little oxygen causes smothering—too much causes surface darkening and off-flavors.

Enzymic action is speeded up by heat. An ear of corn breathes eleven times as fast at 86 F. as at 40 F.—converting sugar to starch and toughening the kernels. Asparagus gives off about seven times as much carbon dioxide at 75 F. as it does at 33. Cauliflower and broccoli have a two to four day storage life at 70 F.; eight to twelve days at 50; and thirty-six to sixty days at 32 F. Shell eggs at a temperature of 29 to 32, with relative humidity of 85 to 87 per cent, may be kept four to five months as good table eggs. They will keep *one week* at 75 F.

Quality and Freshness

What then is quality? It is the *right* variety for the purpose intended, in or on the *right* soil under favorable climatic conditions, and harvested at the *right* stage of maturity.

What is freshness? It is the condition of the product at the instant of harvest. It will never be any fresher. Freshness is lost when physical and chemical changes have brought about a noticeable deterioration in flavor, color, texture, succulence, crispness or maturity.

How can freshness best be retained? By providing at the instant of harvest, and continuously thereafter, the conditions of sanitation, temperature, humidity, oxygen, light, and security from bruising, which are calculated as optimum for the individual product under consideration.

In fruits and vegetables this treatment includes precooling immediately after harvest and packaging to exclude undue amounts of oxygen and to prevent loss of moisture, boxing to prevent bruising and mechanical injury, storage in the proper conditions of temperature and humidity, prompt removal of decayed material, and sanitary conditions which will prevent contamination by dust, mal-odors, etc.

The favorable conditions of storage and handling must be continuous from the grower and shipper through the carrier and wholesale and distribution agencies, and also in the hands of the user until the hour of consumption.

For many years the science of food preservation has steadily progressed. It was the genius of Clarence Birdseye which in the 1920's gave birth to the frozen food industry. And it was the recent war which gave that industry its great impetus. Rapid strides have been made in the technology of quick-freezing. Orange juice is now being economically concentrated at a temperature so low that no change in flavor can be detected. Surplus water can be boiled off at 40 F. The concentrate is then frozen. The "Polyphase" process recently introduced provides exceptionally rapid freezing, and delicate fruits, whole strawberries, etc., are frozen separately and solidily in four to nine minutes. The machine has a thousand pounds per hour capacity. Freezing is one way to stop chemical changes and arrest enzymic activity in food, and to preserve freshness.

Ice for Vegetables

In the preservation of non-frozen fruits and vegetables, crushed and flaked ice is becoming increasingly important. During the past year more than 5000 retail merchants have learned, in special schools conducted by the United Fresh Fruit and Vegetable Association, that ice is indispensable for the over-night or week-end storage of hold-over material. Top-icing with snow-ice sprayed from a power hose is now standard practice in lettuce loading areas. Ice-bed displays of crisp salads, chilled desserts and fruit juices are now a normal part of good cafeteria sales promotion.

The outlook for 1949 is that the per capita consumption of fresh fruits will be 98 per cent of the pre-war average but that the consumption of canned juices will be four and a half times, and of frozen juices three and a half times the pre-war average. The consumption of fresh vegetables will be 108 per cent of the pre-war average, but frozen vegetables will amount to 650 per cent of the pre-war consumption.

Increase Consumption of Perishables

In contrast with the pre-war average, Americans in 1947-48 consumed more of each type of food, except the items of wheat, rice, butter, fats, sweets, potatoes and sweet potatoes, and dried beans and peas. In other words the consumption of perishable supplies has been "stepped-up." The pre-war consumption of meat was 126.2 lbs. In 1947-48 it was 150.6; fluid milk and cream went from 340 to 390 lbs. per capita; fresh eggs from 37.3 to 47.6 lbs.; fresh fruits from 138 to 141; and fresh vegetables from 235 to 248.

The trends of consumption and of marketing indicate an ever-growing need for refrigeration and the other conditions of proper storage which will retain freshness in each product to the greatest possible degree. Technological and engineering skill are pointing the way to whole new industries to supply this protection to foodstuffs. Through them we may expect a greater degree of efficiency in the retention of this precious quality called freshness. It is the thing which restaurant men seek and which restaurant men hope that industry will always be able to provide.

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From a Home Economist

By Mary I. Barber

Director of Home Economics, Kellogg Company, Battle Creek, Mich.

DR. MARY PENNINGTON first made me conscious of the value of refrigerated foods. She gave generously of her time and specialized information to the Foods and Cookery staff at Teachers College, Columbia University. Many tests were made on broths and gelatin mixtures held at different temperatures in an ice refrigerator.

Taste tests were made on hundreds of eggs. Cases of eggs which had been in cold storage from one to twelve months were delivered to the department. Samples from each case were poached and blind tests were made on them plus poached "fresh" eggs. This work proved to us that egg quality is not impaired by cold storage for a period of at least a year.

The attitudes of homemakers have changed greatly in the last two decades. "Cold storage" is considered essential and meets with hearty approval. There are comparatively few people who do not realize the great benefits of refrigeration to our food economy. Here in Michigan we enjoy fresh fruits and vegetables from every part of the United States and from some other countries. Meats are tender because they can be held in storage until right for the consumer. Butter retains its sweet flavor for long periods of time. The freezing units in stores enable a wide variety of products to be kept for days all ready to take home to cook easily and quickly. It is difficult today to think back to the time when we were not so fortunate as to have refrigerated foods available.

Freezing Protects Mine Workers

THE FREEZING of mud or soft earth to hold it in place while the sinking of shafts or other construction work proceeds has been utilized for more than 50 years. Apparently the use of caissons for sinking shafts came along and freezing has not been used so widely in recent years. Temporary dams of soft earth have been solidified by freezing to hold back quick-sand and reduce cost of excavation for permanent dams.

Now it is reported from England that freezing is being used to strengthen wall structure in a coal mine near Nottingham. The mine shaft passes through or near to a porous limestone formation which is flooded and from which the Nottingham water supply is drawn. To make the shaft safe, costly underground construction would be required and expensive pumping equipment would be needed to keep the mine dry.

As an alternative refrigerant pipes have been placed in underground formation so that the area around the mine shaft can be frozen. A considerable saving is expected in cost of construction, investment in water pumps, and pumping power.

Liability of Warehousemen for Loss or Damage -Protective Forms of Warehouse Receipts

By Reginald L. Vaughan
Attorney at Law, San Francisco, Calif.

I BELIEVE it proper that I first discuss the theory under which a warehouseman is allowed to limit his liability for loss or damage to property under his custody and control. This will serve to emphasize the importance of proper notice to the storer of such limitation of liability. I will then discuss the wording of hand receipts and warehouse receipts best calculated to protect the warehousemen as to such limited liability.

We know, of course, that a warehouseman is not an insurer of the goods stored by him and that his duty is only to exercise ordinary care. In other words, where a warehouseman is not negligent he cannot be held liable. This sounds fine, but we know it is not much help to the warehouseman. When a storer proves that his goods are lost or damaged, the practical burden of proof shifts to the warehouseman who has to show that he, or his employees, were not negligent. This is generally difficult.

This report presented by Mr. Vaughan who is an attorney in San Francisco was made at the annual meeting of the Pacific States Cold Storage Warehousemen's Association held in San Francisco, October 21-22, 1948. It created much interest since it contains information on an important subject which every warehouseman should know.

Furthermore, when the holder of a warehouse receipt presents the receipt to the warehouseman and does not get his goods, he has a cause of action against the warehouseman for conversion by merely alleging presentation of the receipt, tender of the amount of charges due, and failure of the warehouseman to deliver. Negligence need not be mentioned.

The warehouseman who loses or damages goods, is therefore in a difficult position. He is somewhat at the mercy of the storer who may grossly exaggerate the value of the goods lost or damaged. The idea of limitation of liability is to protect the warehouseman under these circumstances.

Limited Liability

The basis of limitation of liability is agreement between the storer and the warehouseman to limit the value of the goods. The United States Supreme Court, in *S. S. Ansaldo San Giorgio I vs. Rheinstrom Bros. Co.*, 294 U.S. 494, 79 Lawyer's Edition 1016, had the following to say about limitation agreements.

"One is a true limitation agreement. It recites that a sum named in the bill of lading is the agreed value of the goods, or their value per unit or per package, in the absence of the shipper's declaration of a higher value; that the rate is fixed with reference to the specified value, and if a greater be declared a higher rate will apply; that in consideration of the rate to be charged, the carrier's liability for loss or damage shall be limited to the stipulated value. In case of loss or damage this clause enures to the carrier's but not to the shipper's benefit. The latter can in no event recover more than his actual loss, but may have to take much less. The damages are computed in the usual way without refer-

Paper presented at annual convention of Pacific States Cold Storage Warehousemen's Association October 21, 1948.

Commercial Law to be Revised By American Law Institute

FOR some time the American Law Institute, a subsidiary of the American Bar Association, has been working on a revision of the body of commercial law now in effect by the federal government and the several states. The entire project is to be known as the Code of Commercial Law and is a product of a joint effort by The American Law Institute and the National Conference of Commissioners on Uniform State Laws.

The Code of Commercial Law is now in draft form. When it has been completed and adopted by the Conference of Commissioners it is to be recommended for adoption by the legislatures of the several states. Too rapid progress in this program should not be expected but since it will find wide and important support from all branches of business and commerce there should be reasonably rapid progress toward the establishment of a uniform code of commercial law throughout the nation. It probably will be completed some time in 1949 or 1950.

The warehousing industry is particularly interested in this project because the proposed revised body of commercial law will include phases of warehousing procedure such as warehouse receipts, liability for loss or damage to stored products, and other regulations and procedures relating or pertaining to warehousing.

The Committee on Warehouse Receipts and Warehousing Law of the National Association of Refrigerated Warehouses is interested at the present time in relieving warehousemen from certain provisions of the Uniform Warehouse Receipts Act, as follows:

(a)—the cumbersome and unbusinesslike requirements as to lost negotiable receipts;

(b)—the technical and ambiguous requirements for statement of warehousemen's lien on receipts;

(c)—the confusion or difficulty in distinguishing between negotiable and non-negotiable receipts;

(d)—the criminal liability attaching to a warehouseman in regard to delivery of goods covered by a lost negotiable receipt.

(e)—the limitation of liability of a warehouseman, except in case of his gross negligence or fraud.

This committee has been in contact with The American Law Institute, is familiar with its project to establish a uniform body of commercial law and has exchanged some views on the subject. A more detailed report on this project will be presented at the 1949 annual convention.

The American Law Institute is composed of leading members of the Bar appointed by governors of the various states. It continues the work started many years ago by the Conference of State Commissioners for uniform laws.

ence to the stipulation, but, if when so computed they exceed the agreed limit of value, no recovery of the excess may be had.

"Such a stipulation, we have said, is not enforcible unless the shipper, for agreeing to such a limitation of the carrier's liability, receives a consideration consisting in the offer of a lower rate as against a higher rate offered for the service without such limitation; or, as has been said, the rate is tied to the release. Agreements of this kind are held to be reasonable and not offensive to the public policy against contracts relieving the carrier from its own negligence. The agreement as to value in consideration of carriage at the lower rate thus obtained is held to stop the shipper from demanding damages in excess of the agreed value."

The Ansaldo case involved a common carrier; not a warehouseman, but the principle of the limitation agreement remains the same. You can readily see that the elements enumerated in the excerpt of the decision quoted are the same as those involved in the limitation of liability clause in our tariffs.

Now let us examine some of the difficulties the warehouseman faces when a storer sues, urging that the warehouseman was negligent.

Alleged Negligence

First, the storer will probably cite Section 3 of the Uniform Warehouse Receipts Act which provides, in substance, that a warehouseman cannot, by contract, impair his obligation to exercise due care. The rule is well established in California that the warehouseman cannot limit his liability so as to exempt himself from damages resulting from his own negligence. *England vs. Lyon Fire Proof Storage Co.* (1928) 94 Cal. App. 562, 271 P. 532. At this point, if he is going to prevail, the warehouseman must make clear that the limitation agreement is not an agreement impairing his obligation to exercise due care.

He must establish that the limitation agreement is one to provide service at a minimum tariff rate, that such minimum rate required a ceiling on the amount of the warehouseman's liability, and that the storer had the choice of this minimum rate with limited liability, or a higher rate with greater or full liability, and with these facts in mind had agreed to the limitation of liability. It must be emphasized that the limitation of liability is to be applied, regardless of the cause of the damage or loss, since it is a presumption of a specific stated value of the goods.

We face a difficult task here. Take the extreme case where the court finds that the warehouseman, or his employees, are guilty of wilful wrongful acts which result in loss or damage to certain goods, on which the storer has chosen to pay the minimum tariff rate for storage, and the goods are such that anybody knows they are worth much more than the amount of the limited liability. It is unlikely that the court will allow the warehouseman to wilfully create a situation by which he benefits from his wrongful act. That would obviously be unfair.

The court cases in California do not furnish a clear answer to our question.

It has been stated in California, following the analogy of railroad cases, that by requiring the bailor to declare the value of the goods before storage, the warehouseman may limit his liability, even for negligence, to such declared value; or if the storer fails to state their value upon request, the liability may be limited to a specified sum. *(See McMullin vs. Lyon Fire Proof Storage Co.* (1925) 74 C.A. 87, 239 P. 422; *Wilson vs. Crown Transfer etc. Co.* (1927) 201 C. 701, 258 P 596). This is in line with the theory of the United States Supreme Court announced in the Ansaldo case, noted earlier.

In the *Wilson* case the Supreme Court of the State of California quotes from the old case of *Taussig vs. Bode and Haslett*, 134 Cal. 260, in which the court referred to the notice contained in a warehouse receipt as follows:

"We think it clear that the notice is a part of the contract. It was printed plainly on the face of the receipt. The whole paper is extremely brief. It was the duty of respondents to take note of its contents, if they had the opportunity, and their opportunity was ample. The presumption therefore, is, that they did read it. Against this presumption there is no evidence, and none, we think would have been admissible to show that the respondents had failed to do what their duty required them to do."

The Court went on to say, again referring to the *Taussig* case,

"The court could well have held in that case that it was conclusively presumed that the respondents read the notice and were bound thereby. In the present action a very different state of facts is presented."

Here are the facts which led the court in the *Wilson* case to decide the case against the warehouseman. First, the storer stated that she never saw the limitation of liability clause; second, the warehouse receipt itself was not before the court; third, counsel for the warehouseman admitted that the clause was part of certain matter in very small type printed at the top of the warehouse receipt; fourth, the storer specifically told the warehouseman that the goods were very valuable. You will note that the *Wilson* case itself does not decide what the rule would be where the storer did in fact have actual knowledge of the limitation of liability.

One other aspect of the *Wilson* case is of interest here. The court emphasized the fact that the warehouseman knew the true value of the goods and made no demand for any increased rate of storage. This emphasis on the question of knowledge of the warehouseman of the value of the goods stored is, of course, dangerous. We know that the warehouseman does have a fair knowledge, in many cases, of the value of the commodity stored.

I now turn to the case of *Scott's Valley Fruit Exchange vs. Growers Refrigeration Co. Inc.* decided by the District Court of Appeal, First District, Division I, on September 8, 1947. This case is, of course, partly responsible for the focus of attention on this problem of notification to the storer of limitation of liability.

The facts of the case and the conclusions to be drawn from it were summarized in the Association bulletin of December, 1947. This bulletin states:

Claim for Damages

"This case involves a claim for damages in connection with the spoilage of some 1860 lugs of fresh pears which were stored with Growers Refrigeration Co. Inc., a public utility warehouseman in San Francisco. Certain important and far-reaching findings have been advanced by the court in this proceeding relative to warehousemen limiting their liability . . . However, it is of importance that the warehouseman was held responsible for the full market value of the property damaged even though maintaining certain limitation of liability provisions in its tariff on file with the Public Utilities Commission.

"In this respect the warehouseman did not issue its 'standard' warehouse receipt which was said to contain, among other things, a provision to the effect that defendant was not liable for any injury to the goods in excess of $25 unless the true value of the property was stated in the receipt. There was issued, however, a so-called 'hand receipt': 'Customer in accepting this receipt agrees to rules of our standard warehouse receipt and is bound thereby'. The records show that defendant did not furnish a copy of the 'standard' receipt to plaintiff nor did defendant inform these parties of the limited liability features hereof.

"Specifically, the trial court found that 'neither Hunt nor plaintiff had been told that the rates for the storage were on any basis other than the full value of the pears deposited; that it was the general custom of the defendant to issue only the "hand receipt" to its customers, and that it was not its custom to issue a formal warehouse receipt; that the "formal warehouse receipt was not during the said periods usually or customarily issue by defendant"; that the formal receipt introduced into evidence was not the "standard" receipt of defendant and was not similar to that employed by other public warehousemen in San Francisco; that defendant knew that neither Hunt nor plaintiff had ever seen a copy of the warehouse receipt; that defendant knew that both Hunt and plaintiff believed that the rate charged for the storage was based on the full value of the pears; that defendant never notified Hunt or plaintiff to remove the pears, and that the first notice plaintiff had of the destruction of the pears was on September 13, 1943.

"The District Court of Appeal in upholding the findings of the trial court said: 'In an action for conversion of pears stored in defendant's warehouse, the trial court was justified in holding that the terms of a warehouse receipt purporting to limit materially the liability of defendant were not part of the contract of bailment and hence were not binding on plaintiff where the evidence showed that no copy of the receipt was furnished to plaintiff, that is officers did not know the terms of such document, and that no attempt was made to call their attention to it.' The reviewing court also stated that 'For the terms of another document to be incorporated into the document executed by the parties the reference must be clear and unequivocal, the reference must be called to the attention of the other party and he must consent thereto, and the terms of the incorporated document must be known or easily available to the contracting parties.' "

Precautions by Storer

Here, we have the emphasis on the necessity of notifying the customer of the conditions of the storage. Of course, this case was decided against the warehouseman and we only know that what he did was insufficient. The case does not tell us what would have been sufficient to protect the warehouseman. We can only be cautious and attempt to notify the customer as clearly and in as much detail as is practicable. The ideal procedure would be to obtain the storer's signature to a warehouse receipt or hand tag so worded that the agreement for limitation of liability could not be denied.

These two elements must be considered; first, what we print on the receipt; second, how we put it on. To take the second element first, you are not going to win a case if the storer states in court that he did not know of the limitation of liability, and it turns out that the provision is written in very fine print on the back of the receipt. The courts have frequently found that a party signing such a receipt is not under a duty to read fine print on the back. Whatever we decide to put on the receipt should therefore be on the front and in good size print. It should also be immediately above the line on which the storer signs, if this is feasible. We can find the items to put on the face of the receipt by reexamining the wording of the United States Supreme Court case quoted earlier.

Now, I realize that the front (obverse) of a warehouse receipt must leave room for the description of the goods and that there is not room for lengthy recitals of limitation of liability. The clause worded in the December bulletin reads as follows:

"WAREHOUSEMEN'S LIABILITY IS LIMITED TO $.....per ton of 2000 lbs. unless a higher value is declared by storer in writing at the time the property is placed in storage and storage rates paid based on the excess value. Claims for loss or damage must be presented within thirty (30) days after the delivery of the merchandise from warehouse, or, in case of non-delivery, then within thirty (30) days after storer is informed of the loss or damage."

When we bear in mind that the legal justification for permitting a warehouseman to limit his liability rests upon the fact that he stores the goods at a minimum rate in exchange for the storers agreement to such limitation, it would seem to me to be advisable to include in the clause a statement to the following effect:

"In consideration of the minimum rate charged by the warehouseman for the storage of your property our liability is limited to $.....per ton of 2000 pounds unless you desire to declare a higher value for which you will have to pay a higher rate."

In other words, the minimum rate has been fixed on the basis of the value of 25 cents per 100 pounds and it is as logical as it is necessary that if the warehouseman is to be held liable for a higher value the storer must pay a correspondingly higher rate.

Such an insertion not only gives the storer the notice required by the court decisions but likewise informs him as to the basic reason for the limitation clause.

I believe this wording is sufficiently concise to be inserted on the face of the warehouse receipt. The same is applicable in the case of hand tags. Even though the hand tag may state on its face that a warehouse receipt will be issued upon request, it seems to me necessary to get our statement of limitation of liability on the fact of the hand tag itself. In practice, a customer may get many hand tags and no warehouse receipts.

You will note that this bulletin has also taken care of the 30-day notice of claim provision.

Time Limit on Claims

When we require a customer to present his claim within 30 days after the termination of the bailment of storage, as in Rule 55 of Cold Storage Warehouse Tariff No. 12, we cut down very substantially the time within which the customer could present his claim if this provision of Rule 55 did not exist. The courts have sustained this limitation as a reasonable one, but here again we must be sure we are in a position to satisfy a court that the customer had notice of this 30-day limitation. The way to achieve this is to print the provision on the face of the warehouse receipt or hand tag, as stated earlier.

Additional clauses which should appear on the hand tag are the following. I quote again from the December bulletin:

"(a) This is not a warehouse receipt. Upon request this receival tag may be exchanged for a warehouse receipt covering these goods. The goods stored under this receival tag are subject to the terms and amounts of limited liability as provided in the warehouse tariff of this company.

"(b) These goods are placed in storage subject to the terms and conditions shown by the standard warehouse receipt of this company and the tariff rules and regulations in effect at the time as on file with the Public Utilities Commission of the State of California and open to inspection in the office of this company."

I also draw your attention to the method of rate quotation suggested in the bulletin and recommend that you adhere to it.

"(2) When making any rate quotation to potential storers, warehousemen should point out to such parties that the rates quoted are predicted upon a limited liability of so much per ton. This could best be accomplished through the use of standard rate quotation forms setting forth among other things the provisions of Tariff No. 12 with respect to the limitation of liability. Such forms are being used to

advantage by certain merchandise warehousemen. They not only afford these warehousemen the desired protection but also serve as a timesaver in preparing rate quotations. A similar form suitable for use by cold storage warehousemen is now in the state of preparation and will be offered for your approval in the near future.

"(3) All storers should be kept advised (perhaps annually) of warehouseman's limited liability. Appropriate records of such notification should be maintained by the warehousemen to show in written record form (a) the precise notice given; (b) date and address of transmittal; and (c) name of storer. Such notification could be accomplished either through separate mail notices or by including a statement of limited liability with monthly storage bills.

I think you can gather from my remarks that in order to protect yourself as to the limited liability provision of the tariff, as well as the 30-day notice of claim provision; the important element is to be sure that the storer has actual knowledge of both provisions. Furthermore, in each storage transaction, it is necessary that we have actual proof not only that the notice was given but that the storer had knowledge of these provisions. If it were possible to have the storer sign a storage document, including these two provisions, that would constitute an admission on his part that he had knowledge thereof.

I strongly urge that if your warehouse receipt and hand tags do not contain the provisions suggested by Mr. Bailey, that they be inserted conspicuously on the front of each such document. This will represent about as much precaution as you can take. I cannot tell you in advance of a given case whether or not these precautions will operate to bar a claim for damages but at least you will be able to rely upon them in defense of any claims for negligence on your part.

These two provisions have been in our tariffs for a long time, claims have been settled on the basis thereof and we have the benefit of court decisions upholding their validity.

But remember these safeguards will avail you nothing unless you can prove in court that the storer had actual notice thereof at the inception of the storage transaction.

The Pacer Committee—Why, What and How

By The Chief Pacer

THERE was a birth back in May of 1948, the birth of a committee. Not just another committee, but a committee dedicated to the task of promoting the *inevitable growth and prosperity of the refrigerated warehousing industry*. The committee was named the "Pacer Committee" —P for Progress, A for Action, C for Coordination, E for Education and R for Research. The idea of this committee was basically a public relations committee. It was decided that there were eight tools with which it could do its work:

One was research—not the kind of research that the Foundation is engaged in, but research primarily in what the members of our industry expect of their association. We also are using the results of Dutch Diehl's research and are attempting to help him disseminate the information regarding his research to the industry.

2—We are helping the National Association of Refrigerated Warehouses to activate and energize the industry activities where needed.

3—We are using every available media to tell the story of refrigerated warehouses. News releases have gone out, more of them are going out. There will be feature stories, technical articles. Yes, the Pacers are a loud voice for the National Association of Refrigerated Warehouses.

4—There are going to be more pamphlets, more bulletins, more thought molders, all of which will be used to tell the world about refrigerated warehousing.

5—We are attempting to activate more local and regional meetings, getting the grass roots of our industry together and impressing upon them that the Refrigerated Warehousing Industry is one of the most important industries in the world.

6—We are doing everything we can to strengthen and constructively build our trade relations and already we find a better and closer cooperation between NARW and its allied industries.

7—We encourage public appearances by industry members to tell the story of refrigerated warehousing to the end that there will be a better understanding among all people of what refrigerated warehousing really is.

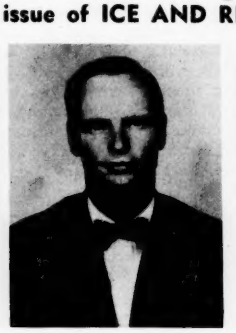
8—We, the Pacers, are helping the National Association pace this industry to bigger and better things.

The Pacers already number over 100. Forty-two of these men from all over the United States are the activating group of Pacers. They are men who believe in the Refrigerated Warehousing Industry—men who are convinced that their business is the greatest business in the world. These Pacers, during the past year, have made substantial contributions to the better understanding of our industry. Numerous articles have been contributed to trade publications. Many appearances have been made on the public platform. Bulletins have been issued to the membership. The Pacers are actively building the program for San Francisco.

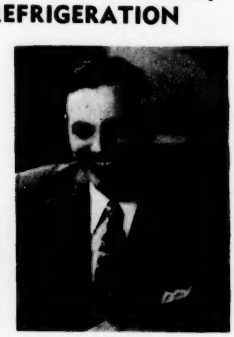
Pacers believe that the Refrigerated Warehousing Industry is the great reservoir of the nation's food supply. It is a service vital to the health and welfare of the American people. It is a service vital to all of industry. Refrigerated warehousing is essential to our great American economy. The Pacers in the future will convince the world that these are whole truths.

Chief Pacer Shoemaker and two Chicago Pacers—Advisory Editors for this issue of ICE AND REFRIGERATION

Garth Shoemaker



Al Winston



Bill Baker

Refrigerated Warehousing Industry

NEWS • ARTICLES • ANNOUNCEMENTS

NATIONAL ASSOCIATION of REFRIGERATED WAREHOUSES

Division of American Warehousemen's Association

Executive Offices:
Tower Building, Washington 5, D. C.

Executive Secretary, W. M. O'Keefe
Executive Vice-pres., Wm. Dalton

President, Edgar M. Burns
Portland, Ore.

Vice-president, Arthur N. Otis
New York, N. Y.

Treasurer, Fred F. Alford
Dallas, Tex.

48th Annual Convention — Business Sessions and Entertainment Promise High Peak

A RECENT announcement from headquarters of the National Association of Refrigerated Warehouses says that the Housing Committee under direction of Leon A. Bailey is working overtime to make a success of the 48th annual convention to be held at the Fairmont Hotel in San Francisco, February 7-10. The same report states that the officers and committee members are getting ready for the greatest convention ever held by the Association.

And from the Pacer Committee, in charge of the business program, comes word that the sessions will get off to a fast start on opening day with down-to-earth addresses by top-flight leaders of industry and labor before the entire assemblage. The following three days will be taken up by separate sessions of AWA's two divisions, the Merchandise Division and the National Association of Refrigerated Warehouses.

The panel discussions and speeches in these sessions will be slanted to the specific problems of each segment of the industry. Theme of the NARW session will be "Merchandising Refrigerated Warehouse Space." Each day will have a sub-theme and will be devoted to consideration of a particular aspect of the problem in keeping with the theme for the day. The Merchandise Division sessions promise to be of equal import for dry storage operators.

Convention Opens Monday

The convention will convene Monday morning at 10 o'clock with the first general session of the American Warehousemen's Association. At noon, time will be taken out for a tour of San Francisco Harbor.

The Association of Refrigerated Warehouses will open its convention Tuesday morning with sessions following all day Tuesday, Wednesday and Thursday. The convention will be brought to a final close with the closing session of the American Warehousemen's Association which is scheduled to start at 4:00 p.m. Thursday afternoon.

Business Displays

One of the features of the convention will be outstanding display contributions from refrigerated warehousing people. If any one has an idea, a pamphlet, a picture of a business form, any of which are unusual and might assist another member in his operations, they are asked to send it to the Washington office. A series of "bullein boards" will be available in the convention room on which will be placed worthwhile samples of advanced and improved procedures and operations in refrigerated warehouses.

On the entertainment program, a sneak prevue mentions such attractions as a complete Bay Cruise and a forty-nine mile scenic drive and special features and attractions from the gigantic San Francisco '49'er celebration.

AWA Program

For the opening and closing sessions conducted by the American Warehousemen's Association, special features will be tied in with the 49'er Centennial celebration and a top notch business program keyed to the advancement of this vital industry has been planned. The general sessions will feature leaders of industry and labor, speaking on topics of current concern. Particular emphasis will be placed on merchandising and research. Out of this program is expected to come new ideas, new plans and new thinking.

Special Train from Chicago

A special train for the convenience of delegates, their families and visitors will leave Chicago at 1:15 p.m. Wednesday, February 2. It will arrive in San Francisco on Saturday at 1:30 p.m. Those who evpect to take this train are advised to check their hotel reservations to see that they conform to the time of its arrival.

The official program is as follows:

Official Program

SATURDAY, FEBRUARY 5

6:30 p.m.—Executive Committee Dinner Meeting.

SUNDAY, FEBRARY 6

10:00 a.m.—Membership Meeting, Refrigeration Research Foundation.

2:00 p.m.—Meeting of Board of Governors, Refrigeration Research Foundation.

6:30 p.m.—AWA General Board Dinner Meeting.

MONDAY, FEBRUARY 7

10:00 a.m.—Opening General Session (Report of Genera] Officer, Committees and addresses by prominent leaders of industry and labor).

10:00 a.m.—Meeting of Executive Committee, Refrigeration Research Foundation.

2:00 p.m.—Tour of San Francisco Harbor.

TUESDAY, FEBRUARY 8

8:00 a.m.—NARW First Timers' Breakfast sponsored by the PACERS.

The Refrigerated Warehousing Industry

-A Cordial Welcome To California-

ALL of the commercial warehousemen of California take this opportunity to extend a most cordial invitation to the warehousemen of America to participate in the 58th annual convention of the American Warehousemen's Association to be held in San Francisco, February 7-10, 1949.

Atop Nob Hill, in quiet and pleasing surroundings in our renowned city by the Golden Gate, the convention proceedings will prove to be exceptionally enjoyable and profitable to those fellow warehousemen who join the crusade of '49ers which is headed for California next February.

The advance plans for the AWA business and social program are sufficient within themselves to cause a second Gold Rush to California—without taking into consideration less important inducements such as our State's Golden Centennial . . . the locale which is the world's most scenic city . . . our two world-famous Bridges crossing our harbor . . . Chinatown . . . Fisherman's Wharf . . . our Cable Cars . . . unique eating establishments, and other places of interest falling within the category of "seeing is believing."

Hurry, fellow warehousemen . . . it's later than you think! Don't miss this highspot in AWA conventions. So far 483 persons have made hotel reservations and while the accommodations at the Fairmont and Mark Hopkins Hotels are already about fully subscribed, there are ample double room accommodations contracted and available at the nearby Sir Francis Drake Hotel provided reservations are placed promptly before the deadline when the commitments expire. It is advisable for you to hustle and complete all the details for travel and hotel conveniences while time still remains.

Let us hope that you will not be "the one who wasn't there." The 58th will be the one convention warehousemen can't afford to miss. You will find that San Francisco and all the Pacific Coast have but one drawback . . . it is a place you perhaps may not want to leave. It is the gateway to the Orient and Asia and possesses a heritage which was wrought from a series of earlier crises. Truly, no other commonwealth of people have a more distinctive history of tragedy and victory.

LEON A. BAILEY, Chairman
San Francisco Convention Committee

10:00 a.m.—NARW Corporate Business Session:

10:00 a.m.—Remarks of President.

10:20 a.m.—Report of Treasurer.

10:30 a.m.—Report of Nominating Committee.

10:40 a.m.—Announcements.

10:45 a.m.—Report of Executive Vice President.

11:00 a.m.—Reports of Committees on Legislation. Insurance, Safety, followed by discussion.

12:00 (Noon)—Election of Executive Committeemen.

12:45 p.m.—NARW Executive Committee Luncheon. under direction of H. C. Diehl, Director, TRRF. Addresses and discussion.

2:00 to 5:00 p.m.—"Merchandising Through Research"

6:30 p.m.—AWA Family Party — cocktails and dinner

WEDNESDAY, FEBRUARY 9

8:00 a.m.—AWA Banking Committee Breakfast.

10:00 a.m.—"Merchandising Through Inter-Industry Cooperation."

10:45 a.m.—"Merchandising Through Human Relations" Supervisory Management. Employees Organized and Unorganized.

11:30 a.m.—"Merchandising Through Community Relations." Civic interest and participation, Open House, etc.

12:45 p.m.—Public Relation Luncheon featuring prominent speaker in public relations field.

2:30 p.m.—Public Relations Forum. Addresses and general discussion.

6:30 p.m.—AWA Annual Banquet.

THURSDAY, FEBRUARY 10

Theme for the day—"Merchandising Through Service"

9:30 a.m.—Film on Cold Storage Operations.

10:00 a.m.—"Merchandising Through Tariff Building and Cost Controls."

10:45 a.m.—"Merchandising Through Materials Handling,"—Film on Materials Handling.

11:30 a.m.—"Merchandising Through Your National Association."

11:45 a.m.—"Merchandising Through Intra-Industry Cooperation."

2:00 to 3:30 p.m.—General Refrigerated [illegible]ousing Forum to discuss industry problems and issues.

3:30 p.m.—Report of Resolutions Committee.

3:45 p.m.—Installation of Officers.

4:00 p.m.—AWA Closing General Session.

Refrigeration Research Foundation Annual Meeting

IN connection with the annual convention of the National Association of Refrigerated Warehouses at San Francisco, February 7-10, the annual meeting of the Refrigeration Research Foundation will be held, starting Sunday at 10:00 a.m. with the membership meeting at which will be presented the president's address, treasurer's report and discussion of financial plans.

Sunday afternoon the director's annual report will be presented and this will be followed by a discussion by W. R. Pentzer of a project on "Dried Fruit Storage." This will include a comprehensive exhibit of dried fruits. Immediately following this session, a meeting of the board of governors will be held. Monday morning the regular annual breakfast meeting of the executive committee will be held.

As a part of the NARW Convention, a joint TRRF-NARW meeting will be held for a discussion on "Merchandising Through Research." Speakers on this important program will include Paul B. Christensen, Merchants Refrigerating Co., New York City; Paul P. Logan, National Restaurant Association, Chicago, and Thomas W. Rector, General Foods Corp., Hoboken, N. J. These speakers are all industrial leaders with national prestige and wide experience. They talk the language of business for the operators of refrigerated warehouses, commercial users of refrigerated commodities and primary users of cold storage facilities. They will have a forceful message on how to use research as a daily implement of business.

Southeastern Training Conference

THE thirty-nine warehouse representatives attending the Southeastern Training Conference held at Birmingham, Ala., December 1-4 were quite pleased with the information provided through the very excellent program. On the first day with the opening discussion by Jim Irwin, questions began and continued in earnest from then on throughout the last day. Among the outstanding events of the conference were J. R. Shoemaker's address, "Cold Alone Is Not Enough" and a lively and profitable meeting of the Southeastern Chapter NARW held in connection with the conference.

Refrigerated Warehousing Review for 1948 and Outlook for 1949

THE following review of the Refrigerated Warehousing Industry has been compiled from letters received from refrigerated warehousemen in representative sections of the country. The most important fact is that space occupancy was down, with 1949 estimates pointing toward a still further, although moderate, decline. Frozen food storage while down, is expected to recover some of this loss in 1949.

Other factors reported on are developing new services, volume of leading commodities, increased costs, the help situation, industry problems, and building better business.

Space Occupancy in 1948

SPACE occupancy generally was down during 1948 although a few houses reported the same or larger. Chief decreases appear to have been in coolers. For 1949 estimates generally point to a further slight decrease.

Modesto, Calif.—Percentage of occupancy was down slightly under 1947 and indications point to a further slight reduction in 1949. The volume of the chief commodities however show little shift.

Colorado Springs, Colo.—Our percentage of occupancy in 1948 was 12 per cent less than in 1947. If commodity prices drop appreciably we look for an increase but if they remain at present levels we will show no increase over 1948.

Pueblo, Colo.—Percentage of occupancy was down about ½ per cent below 1947. We look for a further decrease in 1949 of possibly 10 per cent.

Boise, Ida.—Our occupancy in 1948 was about 12 per cent more than in 1947.

Chicago, Ill.—Our percentage of occupancy in 1947 was 70.6 per cent; in 1948, 86.1 per cent and for 1945 we are estimating 75 per cent.

Sioux City, Iowa—Average occupancy for 1947 was 85 per cent; for 1948, 65 per cent; for 1949 we expect about 80 per cent.

New Orleans, La.—Due to warm weather during the winter months many commodities in New Orleans require cold storage during these months which are not placed in cold storage in other sections. For this reason our winter business compares favorably with our summer load factor. Our percentage of occupancy during 1948 was about two points better than 1947. On an average we were approximately 88 per cent to 90 per cent full.

Boston, Mass.—The percentage of occupancy was down approximately 20 per cent and was reflected in decreased volume of poultry, meat, eggs and dried fruit and nuts. Frozen food tonnage held up well. We attribute the loss of tonnage on poultry and meat to the hesitancy of dealers in our market to carry normal inventories because of unsettled and falling markets in these commodities. Being at point of distribution, hand to mouth buying was prevalent. With large grain crops and lower prices of feed, we hope that market conditions will stabilize next year and that storage stocks of meat and poultry in this area will return to normal. However we hesitate to forecast, because of the dominant part government plays in the food situation and the general unsettled conditions of the world.

Minneapolis, Minn.—The volume of tonnage in freezers in 1948 in comparison to 1947 was larger, the exception being during the last month or six weeks; cooler storage was slightly down. However, there is every indication that a good portion of this will be absorbed with commodities usually available at this season.

Minneapolis, Minn.—Refrigerated warehousing in this area has had a very good year. In one or two instances, a peak year in operational history, however, for the many, it may be said to compare very favorably with the average of the past eight years. In general occupancy has been high, yet it is lowering both as to freezer and cooler. Many houses now have space to fill.

Kansas City, Mo.—Our freezer volume and occupancy held up fairly well as compared to the previous year; however, our cooler volume was considerably less and the overall space occupancy for 1948 was less than the year 1947.

Elmira, N. Y.—Our occupancy for 1948 was down about 20 per cent from 1947 and, as near as we can guess, 1949 will be about 10 per cent under 1948.

New York, N. Y.—There has been a steady decline in occupancy since January 1948 and present indications are that there will be a further decline in December. A casual study of the December 1 government report provides the reasons for the downward trend. The outlook for 1949 while more promising with respect to some commodities does not, at this time, seem to be particularly encouraging. Prices will have to be materially lower to encourage the public to store beyond its immediate needs.

Cincinnati, Ohio—Percentage occupancy for 1948 was about 25 per cent off 1947.

Cleveland, Ohio—From early spring, with the disappointing shortage of eggs to the poor apple crop of the fall season, warehouse occupancy in this section has shown a steady decline. Freezer products have held up more steadily, but do not compare in volume with previous years. It is the hope of the industry that the next month or two will bring increases in meat storage that will start a rise in the barometer of occupancy. Considerable cooler space has been converted to freezers in the past few years, and while demand for freezer space has not reached capacity, the outlook appears that the future holds better prospects for freezer space than coolers. Compared with pre-war years, the warehouses are enjoying much better tonnages. The houses may not reach the 85 to 95 per cent occupancy they enjoyed during the war and a couple of years thereafter, but it is hoped that 1949 will bring better results than the year now closing.

Dayton, Ohio—In 1948 we had an all time high volume of occupancy. This came, however, during the first nine months. The last three months of 1948 compared with the corresponding three months of 1947, were off 15 to 20 per cent.

Toledo, Ohio—Percentage of average occupancy for 1948 is off approximately 20 per cent compared to 1947.

Portland, Ore.—Our percentage of occupancy in 1948 was about 15 per cent less than in 1947, although at the peak, which is June and July we were 100 per cent. This meant that the goods were moving out quite rapidly, and makes it obvious that 1949 will be a much better year for us. The crops in this locality in 1948 were definitely off. We had bad weather, floods and strikes (and an election) and business was definitely off in all lines. We had such a long string of good years that one bad one was to be expected. The effect of it was that the old carry-overs have disappeared, and we believe that we will have practically empty warehouses by the time the next season rolls around next May. So we cannot see any other answer than that 1949 will be a much better year than 1948.

Philadelphia, Pa.—Our occupancy was about on a par with that in 1947, but the flow in and out of the warehouse was reduced considerably.

Dallas, Tex.—Our occupancy showed a decrease for 1948 as compared with 1947 and we expect this trend to continue in 1949.

San Antonio, Tex.—The year 1948 showed a very decided drop in occupancy as compared with 1947, both in coolers and freezers. During most of the year, our cooler occupancy was no more than 50 per cent and our freezer occupancy was around 60 per cent. We anticipate an 80 per cent occupancy for the next three months but hesitate to predict beyond that time.

Seattle, Wash.—Percentage of occupancy both in coolers and freezers during 1948 ran somewhat higher than in 1947. This was partially due to a heavier carry-over at the beginning of the year and a continued fair demand for both types of services.

Milwaukee, Wis.—Our percentage of occupancy in 1948 was considerably less than that of 1947. This was especially true throughout the fall months on cooler occupancy.

Volume of Leading Commodities

THE leading commodities appear generally to have held their own for most houses, although the reports on this are quite varied and no general conclusions can be drawn. For instance some report a decrease and others an increase in the same commodity.

Pueblo, Colo.—Major items stored show egg storage up, apples down, frozen meat up, and potatoes up. Increase in potatoes covered decrease in apples, making fall storage same for 1947 and 1948.

Boise, Idaho—In this territory dairy products and processed foods form the bulk of the cold storage business. Fur storage in coolers is expected to increase.

Chicago, Ill.—Commodity receipts during 1948 as compared to 1947 were: frozen eggs 4 per cent below; poultry 5 per cent below; butter 2 per cent below; shell eggs 3 per cent above; lard 4 per cent below; frozen fruits 2 per cent below; frozen vegetables 3 per cent above; total receipts 2 per cent below. Despite the above figures, our profits for 1948 were above 1947 due, principally, to increased holdings of sundries and dried fruits. In addition, the inventory carry-over at the beginning of 1948 was well in excess of 1947.

New Orleans, La.—We handle a large quantity of molasses in barrels in our section and at the beginning of January we had as many as 10,000 fifty gallon barrels of molasses in storage. This molasses stayed with us all during the year and did not begin moving out until October and November.

Minneapolis, Minn.—Our increased volume was due to amount of cream, butter, cheese and powdered eggs stored. Certain lines of frozen foods have increased but other items of consumer packages were down, this being due to drought in the West having had effect upon the total pack. Poultry and turkey holdings are likewise down, although there is an increase in meat storage.

Elmira, N. Y.—The volume of leading commodities for 1948 was about the same as 1947 in the case of dairy products, and about 50 per cent under 1947 in the case of packing house products. We expect a slight increase in dairy products for 1949 and a further drop in packing house products for the same year.

Dayton, Ohio—The big volume for 1948 was meat which carried over from November and December of 1947. Shell eggs and cream also were important tonnage items for us. Frozen fruits and vegetables were about 25 to 30 per cent less than 1947. Our guess would be that 1949 should produce a larger volume of these commodities because of low stocks now.

Toledo, Ohio—Volume of leading commodities was off somewhat compared to 1947. Not too optimistic about prospect for volume business 1949.

Portland, Ore.—The volume of all commodities in every case except that of strawberries was less than last year. Strawberries would have been less except for the fact that the acreage was very greatly increased and we couldn't get all of the strawberries into the plants. There was not a single group that was not hurt and by this we refer to eggs, poultry, turkeys, meats, nuts, frozen fruits, and vegetables. But don't get the idea that we are mournful at all because we did fair business, but not a good business, and we're all still on deck.

Dallas, Tex.—Our largest drop in volume for the eleven months of this year came in frozen fruits and vegetables and dried eggs. Dried eggs were a government deal which we could expect to drop off.

San Antonio, Tex.—The volume of fresh and frozen meats, which constitutes a large part of our freezer tonnage, was at a low ebb until November when the packers again began an into storage movement which has continued to this date. Owing to a very large pecan crop we will fill our cooler space by the end of the year.

Seattle, Wash.—With the exception of frozen fruits and vegetables most commodities showed an increase in 1948 as compared with 1947. Prospects for 1949 appear good although uncertainty over commodity prices may change this picture materially.

Milwaukee, Wis.—Our 1948 volume, with respect to commodities, was proportionately the same as in previous years except on apples on which item we were considerably shorter than normal. For 1949 we anticipate that the decline in the 1948 volume will continue into 1949.

Storage of Frozen Foods

THE volume of frozen foods was down, coming in part from reduced inventory which was all to the good and in some cases this amounted to a considerable decrease. Expectations are for an increased occupancy in 1949.

Modesto, Calif.—Our business in frozen food shows gradual improvement which we expect to continue through 1949.

Colorado Springs, Colo.—The amount of frozen foods in storage for 1948 was off 50 per cent from the previous year, but we look for an improvement in 1949 because we feel that most of the inferior quality package frozen food is now off the market.

Pueblo, Colo.—Frozen food storage aside from meat is definitely down but was offset by increase in frozen meat. It is expected that frozen food space will stay about the same in 1949 as experienced in 1948.

Boise, Idaho—Not so many frozen foods as in the previous year. We do not expect much increase in '49.

Chicago, Ill.—We received an appreciable amount of frozen vegetables but frozen fruits receipts were light.

New Orleans, La.—Each year we are receiving a larger quantity of frozen foods and I believe we handled more in 1947 than any previous year.

Minneapolis, Minn.—We expect an increase in the volume of frozen foods for 1949.

Kansas City, Mo.—We do not handle large amounts of frozen foods; our volume for the year was approximately the same as the previous year.

Elmira, N. Y.—Our frozen food volume is about the same for 1947 and 1948, and we expect a slight increase in 1949.

Cincinnati, Ohio—Frozen foods were the leading commodities for 1948 as compared to 1947. Prospect for 1949 for frozen foods look favorable providing prices are reduced, meaning more consumer demand. We expect frozen food storage to increase in 1949.

Cleveland, Ohio—The opinion exists that the frozen fruit and vegetable business will expand. The business is in stronger hands and through progressive marketing that branch should continue a healthy growth, despite the serious set-back of a couple of years ago.

Toledo, Ohio—Frozen foods storage was off compared to previous years. Too early to estimate occupancy for 1949.

Philadelphia, Pa.—Our frozen food tonnage is holding up very well, and we expect a further increase in 1949.

Dallas, Tex.—A decrease in frozen foods indicated the reduction in an enormous inventory that almost ruined the frozen foods industry in 1947. We expect frozen foods occupancy to increase slightly in 1949.

San Antonio, Tex.—The amount of frozen fruit and vegetables offered us for storage during 1948 was very disappointing.

Seattle, Wash.—The volume of frozen fruits and vegetables stored in 1948 was considerably less than during the previous year. Floods and a cool wet summer contributed to this. Early frosts in the soft fruit growing areas made for a light set of peaches and apricots and the volume of these products frozen and stored this past year were well below the quantity handled in 1947.

Milwaukee, Wis.—Our volume of frozen foods was considerably lower than during the war period. How much of an increase we might expect in 1949 will depend on general economic conditions, on the prices that will prevail, and the amount of effort made toward obtaining more facilities in retail stores for the handling of frozen foods.

Developing New Services

MODERNIZATION of plant equipment seems to be a necessity, without which modernized service cannot be provided and the feasibility of offering new services seems to rest upon that fundamental.

Chicago, Ill.—We are enlarging our truck receiving and loading facilities. In the past few years a decided trend to truck transportation and away from rail carriers has evidenced itself. Those of us who were not modernized enough to adopt existing facilities to the increased truck business must, despite high construction costs do so.

Elmira, N. Y.—The best way to develop new refrigerated warehousing services is to join the National Association of Refrigerated Warehouses "Pacer" Committee.

Dayton, Ohio—A small house like ours is compelled to do a lot of service for its customers. We meet customers often and because of that, often requests are made which we cannot turn down. We are always on the lookout for information that may be of value to customers. This information is passed along to the group that might be interested.

Toledo, Ohio—For developing new business, research is needed, such as is being done by the Refrigeration Research Foundation, to encourage use of cold storage facilities for commodities that have not heretofore been stored in cold storage warehouses, both cooler and freezer.

Portland, Ore.—Our company, realizing the needs of this section has, in the last few months, improved its equipment by installing in one of the plants new compressors which will produce very low temperature. All other plants have been improved as much as possible. By this we mean the thing that is holding all of us up is the delay in getting the proper equipment. Also, we have improved our handling facilities by mechanization. We believe that in a production area like this that very low temperatures and speed are essential.

Increased Costs

COSTS were up, due to higher wages and higher prices for supplies but rates as usual lagged behind with a consequent adverse effect upon net returns. Hopes for remedying this situation seem to rest largely upon increased efficiency.

Modesto, Calif.—Cost of doing business is up slightly, mainly because of an approximate 10 per cent wage increase in 1948. This was offset to some extent through increased efficiency, most costs holding firm.

Colorado Springs, Colo.—Our costs were distinctly out of line with income as compared to previous years. I again do not see much hope in 1949 of bettering this condition.

Pueblo, Colo.—Costs are higher for both handling and refrigeration.

Chicago, Ill.—Our costs for the current year are 10 per cent above those in 1947.

New Orleans, La.—While our costs during the past year have increased considerably, our revenue due to volume and high load factor was sufficient to offset our increasing cost.

Minneapolis, Minn.—Repair costs and maintenance continue to be very high. Wages look to be going higher. Operative costs remain too high. Many managers see headaches ahead.

Minneapolis, Minn.—Costs have increased due to increased labor rates, and there is every indication of further increases.

Kansas City, Mo.—We were unable to hold our costs in line with our income as compared with previous years and we feel that our big problem in the years to come will be to hold our overhead down and to reduce our expenses in proportion to the reduced volume that we will handle in our warehouse.

Elmira, N. Y.—Costs increased about 10 per cent in 1948 over 1947, with income remaining about the same as the previous year.

New York, N. Y.—Rates for storage, handling and extra services have been well maintained. No one seems to be trying to create new volume by reducing charges.

Cincinnati, Ohio—Costs were much higher, particularly payroll as compared to previous years.

Dayton, Ohio—Our costs were much higher in 1948. They will be higher in 1949, as our power company has increased its rate on the "advance of coal" basis which means an extra $500. per month expense. To our viewpoint this must be added to storage rates.

Toledo, Ohio—Costs continue to increase.

Portland, Ore.—Our costs were in line compared with income for previous years, and we were able to employ adequate help. With our improvements we do not need as much help as in the past, and consequently were able to choose more efficient help, and more help is daily becoming available.

Philadelphia, Pa.—We have been forced to increase our charges to keep up with increasing costs, but with the increase in rates, our income compares very favorably with previous years.

San Antonio, Tex.—Our costs have increased approximately 5 per cent, but our profits are only 75 per cent of the 1947 figure.

Seattle, Wash.—Higher wages and increased cost of supplies materially increased operating cost during 1948. Although some increase was noted in gross income this was not in line with increased costs.

Milwaukee, Wis.—Our costs for the last several years were considerably out of line with income, and we are hopeful that this situation may be at least partially corrected in 1949.

The Help Situation

ON THE help situation generally it is reported in better supply and more efficient although a few report exactly the opposite on both counts. Mechanizing and labor-saving devices such as mechanical handling will help to some extent. As volume goes down, handling costs have a tendency to increase although it might be worked out with reduced personnel. For the year 1949, it is the general belief that conditions will be better or at least no worse.

Los Angeles, Calif.—We were able to employ adequate help during 1948 and the manpower outlook for the coming year is good.

Modesto, Calif.—Adequate help was available all through the year. The quantity and quality has shown, and continues to indicate, gradual improvement.

Pueblo, Colo.—Our employment situation during 1948 was satisfactory and the outlook for 1949 is the same.

Boise, Idaho—The outlook for help in 1949 is generally good. There are a great many good men without work here now. The pinch comes during the farming season, particularly spring and fall.

Chicago, Ill.—Our labor supply is adequate but their productiveness has decidedly decreased. As for 1949, we look for an increased labor supply but still less productive.

Sioux City, Ia.—We were not able to employ adequate help. More workmen are available but they are poor quality.

New Orleans, La.—We have during the past year been able to hire adequate and efficient help, and I do not anticipate any trouble during 1949. We are one of the few cold storages and ice plants in the City of New Orleans which is not unionized, and we feel that this is due to the fact that we offer our employees everything that a union could give them.

Boston, Mass.—We have had no problem in obtaining adequate help.

Minneapolis, Minn.—Although wages look to be going higher, our employment situation is good and we hope it will continue that way during 1949.

Elmira, N. Y.—The labor market was easier, adequate help was available, and we expect no manpower shortage in 1949.

New York, N. Y.—New wage contracts in this area will be up for negotiation. Present contracts expire May 31 and the new wage scale will depend largely upon business conditions that develop between now and next May. Help has been ample for all our needs and we look for it to continue so.

Cincinnati, Ohio—We were able to employ adequate help. Expect to get all help necessary in 1949.

Dayton, Ohio—We may come out O.K. as far as labor is concerned providing volume is as much in 1949 as in 1947 and 1948. If volume does not hold, then our labor expense will be too high. Whether or not this can be worked out with less men, remains to be seen. At the present time we have the best help we had any time during the last seven years.

Toledo, Ohio—Have been able to employ sufficient help. Do not anticipate any difficulty for manpower in 1949.

Portland, Ore.—We expect the employment situation to be easier than it was in 1948.

Philadelphia, Pa.—We believe we pay almost the highest wages in the industry, and possibly because of this, we have been able to employ as many people as we needed and feel we will have no trouble in the coming year.

Dallas, Tex.—The help situation is fair. We are mechanizing to some extent and expect this to improve our efficiency.

San Antonio, Tex.—While we have had no great difficulty in obtaining help it has been of the non-productive type thus increasing our costs while handling much less tonnage.

Seattle, Wash.—No trouble was experienced in getting adequate manpower in 1948. Help was comparatively steady with very little turnover. We do not expect any difficulty with regard to manpower in 1949 although increased activities in defense plants, etc., may tighten the situation slightly.

Milwaukee, Wis.—We have had adequate help all this year and we anticipate this condition will remain that way if we do not get into war.

Industry Problems

INDUSTRY problems constitute a long and varied list of ideas. Among those submitted are cutting of storage rates to get business, increased use of mechanical handling and storage equipment, encouraging customers to store quality merchandise, increased costs and decreased income, the need for uniform standards of temperature for various commodities, improved services to customers and the building of better public relations are a few of those mentioned.

Colorado Springs, Colo.—In my opinion the industry's most outstanding problem in 1948, and the same in 1949, is the cutting of storage rates in order to get the business. We have already encountered lower rates quoted by competitive warehouses in a desperate attempt to fill their rooms. These rates are below the cost of production.

Pueblo, Colo.—Serious consideration for improved handling methods seems in order especially for large warehouses, but mechanization is hampered by design differences in buildings, and in our case small lot movement exceeds carload by an appreciable amount, making mechanized pallet movement impractical.

Boise, Idaho—Freight rates and high costs of transportation are a real problem here. Airplanes are too expensive yet. The principle problems next year will probably be high taxes, high wages, high freight rates without any increase in the price of the goods.

Chicago, Ill.—The big problem is costs. Both plant and engine room costs have decidedly increased, although there is a definite need for newer, more modern facilities including mechanical handling equipment. It has been difficult to determine whether 1948 was the year in which to build or buy. In addition, customer credits are becoming more a consideration. With the pressures placed on our customers by the banks, owing to Federal Reserve increased requirements, working capital has become more and more limited. Collections are now requiring more follow-up effort.

Sioux City, Iowa—Lack of goods for cooler space should have a more uniform standard of temperatures; one firm wants minus 10 F for frozen meat, another wants zero.

Boston, Mass.—We feel the basic problem of the management of cold storage warehouses is to strive to lower costs and improve service. The "hey-day" war period is over. Research through the Research Foundation should be continued with a view of developing new storage products and better ways of storing present commodities. Efforts should continue to publicize our industry through our National Association.

Elmira, N. Y.—The major problem of the industry in 1948, as in previous years, was the problem of public relations. The National Association is activating a program that should materially help in the solution of this problem. There probably will be new problems in 1949—problems of a more specific nature than public relations. Taxes, legislation and labor relations will all probably be critical problems for the industry in the coming year.

New York, N. Y.—Perhaps the outstanding problem in our industry during the past year has been to get down from the long period of high occupancy to a situation more in line with what used to be regarded as normal. To meet this situation and continue operations on a profitable basis is the big issue that is before the industry for 1949. Many expensive habits will have to be laid away on the shelf.

Cincinnati, Ohio—Wage rates was the outstanding problem for 1948. To meet this situation it will be necessary to increase storage and handling rates. We expect new problems to arise in 1949.

Dayton, Ohio—The problem for 1949, as we see it, is the ability to adjust expenses to income. We don't know how this can be done as a group. That is a problem each house must work out for itself.

Toledo, Ohio—The industry needs increased use of mechanical handling and storage equipment. Customers using refrigerated storage facilities should be encouraged to store quality merchandise.

Portland, Ore.—I frankly don't know what our most outstanding problem was, unless it was that of getting down to earth. We had been living in a fool's paradise during the war years, and I sincerely believe that the main objective now would be to give service. Certainly, we are impressing this upon our group, and we are meeting with success. We had been afraid that the shortage of storage space during the war would encourage increased building but that, so far, has not developed and the supply and demand so far as refrigeration space is concerned in this territory seems to be reasonably balanced.

Seattle, Wash.—Ever increasing costs, particularly of labor, was the major problem in 1948 and appears to be the problem facing us in 1949. Streamlining of operation and improved handling of commodities will help. Rates too, may have to go up but then again there may be a limit to that, for there is the question of pricing one's self out of business.

Milwaukee, Wis.—It is hard to relate what our industry's most outstanding problems were as we have been faced with a number of problems such as terrifically high cost of repairs and replacements, and the ever-increasing cost in power plant operations. Another of our problems seems to be the ever-increasing long distance truck hauling of perishable foods at the expense of rail hauls. This is creating a problem at our platform, and which, at the moment, we do not know how to solve.

The Refrigerated Warehousing Industry

Building Better Business

FOR building better business a variety of suggestions are offered, covering mostly those ideas that have been expressed previously. Among them are more advertising, btter written and illustrated; an adequate and intelligent merchandising program; encouraging increased consumption of refrigerated and frozen foods; better service as a means of building customer acceptance and the use of research to show storers the wisdom of using cooler or freezer storage for many commodities not now considered storage material.

Boise, Idaho—We need more advertising, better written and illustrated ads both for next year and every year. The farming industry in this territory was hard hit by failures in both the spring and fall of the green vegetable crops. I think no farm products which do not have some government price support did well this year. Most farmers will grow subsidy crops. The market future of nearly all crops is uncertain.

Chicago, Ill.—One of the worst mistakes a warehouse solicitor can make is the solicitation of increased business from a particular customer when, in his own mind, inventories should, because of high prices, be minimized. To abet one's income, the best bet is the exploitation of more customers with better service as his calling card!

New Orleans, La.—To create better business the refrigerated warehousemen should join the Refrigeration Research Foundation, which was endowed by the warehousing industry about four years ago to find better methods for the freezing and cold storage of perishable food products. If every cold storage warehouseman was a member of this Foundation and followed its teachings, I believe they could render their customers a much better service.

Boston, Mass.—We continue to make gains in our tonnage handled per man hour over the war period. Partly this is due to the introduction of better handling methods and equipment and lack of congestion in our warehouses.

Minneapolis, Minn.—It is difficult to prophecy as to 1949. Some speculative element is desirable in this industry for good occupancy. What is to be expected from the new congress as to taxes, business attitude, farm support, the foreign situation, has weighty influence on the cold storage industry. The new crop outlook will have a decided effect too. We venture the guess that the forthcoming year will be satisfactory but profits won't be as high in future as they have been in the past. We think we can see a profitable operation but we are not shouting about it from the house tops—there are too many turns in the road around which we cannot see.

Kansas City, Mo.—We feel that the average business is not buying ahead and accumulating stocks for speculation; naturally, this is not conducive to large volume business in the warehousing industry. With bumper crops anticipated for 1949, we feel that our volume of business will depend to a large extent on the government's ability to dispose of these surpluses in the foreign countries.

Elmira, N. Y.—The members of the Refrigerated Warehousing Industry must learn to merchandise their services. Only through an adequate and intelligent merchandising program can we create bigger and better business and greater volume for our warehouses. Merchandising will be the theme of the San Francisco Conference and out of that we hope some real merchandising programs will be developed.

Cincinnati, Ohio—Refrigerated warehousemen should attend all cold storage sessions of NARW and act as a group to create better and bigger business and properly serve their present customers.

Cleveland, Ohio—There are too many factors involved to make predictions for 1949. Regardless of economic conditions, if the weather is not favorable and crops grown, the industry will suffer. If and when growing conditions are favorable, if Congress makes no drastic moves to impede business, if labor recognizes that sanity must prevail in its demands, and if there appears to be a future in the produce markets, 1949 should prove far more profitable than 1948. One thing has been proved. There is sufficient public refrigerated warehouse space in this country for many years to come, and we can all be grateful that during the tight situation that existed during war there was no great construction program for new refrigerated warehouses.

Dayton, Ohio—Our individual problem for future development of our business, is to get people in our vicinity to eat more frozen foods. By suggestion and practical knowledge assist customers through good refrigeration methods to know that by storing when plentiful and holding for off-season periods, they profit not only in money but in service to their customers. This policy, as we see it, is productive, not only for the immediate future but for the long range too.

Portland, Ore.—The problem of creating better business is going to be discussed at our annual meeting. That has been the thought in our minds for some time. That is one reason for the Refrigeration Research Foundation. Certainly, better service will create better business, and as research develops, we are going to be able to show our customers the wisdom of using cooler or freezer storage on many commodities not now considered storage material. I believe the slow-down for 1948 is a very good thing. It gives us a chance to put our house in order for what promises to be a much better year in 1949.

Citrus Fruit Investigations

PRELIMINARY reports from the first season's work on a study of storage of Florida and Texas citrus fruits have been made by D. F. Fisher, Washington, D. C. To indicate the nature of these results, some general comments have been released as follows:

Conclusions from the tests with Florida Valencia oranges stored in New York City, beginning April 26, 1948: "Because of decay development at higher temperatures, only at 32 F. was storage of diphenyl-treated fruit practicable for 8 weeks or longer. Orange County fruit (central Florida) was successfully stored at this temperature for 12 weeks,—or even for 16 weeks. However, after 16 weeks, the fruit decayed pretty badly when held for an additional week at 70 F.,—admittedly a pretty severe test. East Coast fruit held up well for 8 weeks at 32 F; although commercially salable after 12 weeks' storage, it was definitely of poorer quality than after 8 weeks' storage."

From storage tests at Orlando, Fla., with Valencia oranges: "Storage at 32 F. was better than at 38 or 50 F. For a two months' storage period 32 and 38 were of nearly the same value. For three months' storage 32 F. was better, while for 4 months' storage the lower temperature was much better. The difference reflected itself more in decay than in rind breakdown. Indian River oranges (representing the East Coast) were more susceptible to rind breakdown with Orange County fruit, although about half of the disorder was too slight to be of commercial importance. Taste was impaired most in fruit stored at 50 F. and least in that stored at 32 F. After 16 weeks at 32 and 38 F., fruit was appraised by local consumers as being 'very good but needed acid', to 'wonderful', depending on whether they preferred sweetness."

Conclusions from the tests on Texas Valencia oranges stored at Harlingen, early in May: "Decay was not serious in any of the lots at removal from cold storage; only a few lots exceeded 5 per cent decay even after 16 weeks. Storage pitting was not of great importance in any of the lots. Oranges stored at 32 F. developed significantly less aging than those stored at 38 F. Quality was considered good to very good after 8 and 10 weeks of storage plus 1 week at 70-75 F. After 16 weeks' storage and one week's holding, a few oranges had developed some storage flavor and seemed, to those of us at the Laboratory, to be somewhat stale. However, many people tasted the oranges and for the most part judged them as excellent for juice purposes."

Conclusions from tests on Texas grapefruit stored at Harlingen, Dallas and St. Louis: "Approximately the same results were obtained at the three places so far as dessert quality was concerned. On removal from cold storage, grapefruit stored at 50 F. for 8 and 12 weeks was of good texture, juicy, mild, sweet and of good flavor. After holding for one week at 75-80 F., the flavor became somewhat insipid and some fruits developed stale flavors. However, at Dallas and St. Louis, many fruits were distributed to typical consumers for quality evaluation. Fruits stored for 8 and 12 weeks at 50 F. and one week at 70 to 75 F. were invariably regarded very highly by those people who knew grapefruit only by what they bought in a store. Fruit held for 16 weeks at 50 F. was definitely off-flavor after one week at the holding temperature."

New Frozen Fruit Product

A NEW frozen fruit product, known as "Frozenspread" is now in production on a small scale at Puyallup, Wash., by P. E. Yates. Made from puree, this product is not heat-processed. It preserves fresh-fruit flavor and aroma. The formula was developed in the Western Regional Research Laboratory in Albany, Calif.

The Refrigerated Warehousing Industry

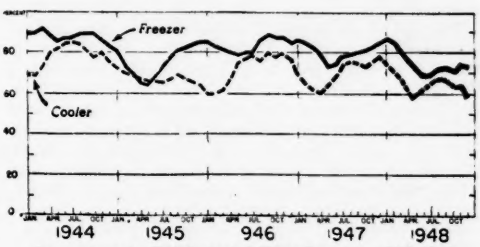
Cold Storages Holdings — Coolers Decrease Freezers Remain Same

OCCUPANCY of coolers based on returns from public cold storage warehouses was indicated at 59 per cent of capacity on December 1, a drop of 5 points during the month of November. Freezers were reported to be 72 per cent filled, indicating no change from a month ago. In the case of coolers the 59 per cent level of occupancy is the lowest recorded for December 1 since the Department began compiling this information. Only once, in 1940 when freezer utilization was 71 per cent, have freezers been used to a lesser extent. Last year at this time coolers were 78 per cent and freezers 84 per cent occupied, thus cooler and freezer occupancy on December 1 was 19 points and 12 points, respectively, above the present figures. Although freezer space for the country as a whole is not tight, Minnesota, Louisiana, Alabama and Mississippi reported their freezers more than 90 per cent full.

On December 1 the volume of perishables held in cold storage totalled 3.8 billion pounds. A net withdrawal, amounting to 48 million pounds was recorded for the month of November. Freezer held commodities reflected a net increase of 15 million pounds—poultry and meats increased while frozen fruits, frozen vegetables, cream, butter and frozen eggs decreased.

TABLE I—COLD STORAGE HOLDINGS IN PUBLIC WAREHOUSES—BY COMMODITIES (000 OMITTED)

	Dec. 1, 1948	Nov. 1, 1948	Dec. 1, 1947	Five-year Average
Meat and meat products, lbs.	517,792	382,124	562,022	505,971
Lard and rendered pork fat, lbs.	70,871	66,526	73,377	78,974
Frozen poultry, lbs.	168,810	154,617	317,112	280,980
Creamery butter, lbs.	59,865	83,412	46,002	93,007
American cheese, lbs.	139,799	167,535	139,355	141,378
Other cheese, lbs.	22,033	23,685	20,825	19,946
Shell eggs, cases	454	1,685	824	1,136
Frozen eggs, lbs.	138,938	169,287	164,673	169,168
Apples, bu.	22,097	22,413	35,790	30,047
Frozen fruits, lbs.	345,660	362,423	392,077	359,303
Frozen vegetables, lbs.	306,056	311,963	323,991	250,429
Frozen fish	157,384	148,049	142,102	136,389



Occupancy in Refrigerated Warehouses—1944-1948

A contra-seasonal decline of 316 thousand bushels of apples brought total stocks on hand to 22.1 million barrels for December 1. This is 13.7 million bushels below stocks of a year ago and 8 million bushels less than the 5-year (1943-1947) average. Pear stocks were drawn down seasonally to a level of 1.9 million bushels.

TABLE II—PERCENTAGE OF SPACE OCCUPIED BY PUBLIC COLD STORAGE WAREHOUSES (APPLE HOUSES EXCLUDED)

	Net Piling Space (000 Cu. Ft.)		Dec. 1, 1948 (%)		Nov. 1, 1948 (%)		Dec. 1, 1947 (%)		5-Year Average (%)	
	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer
New England	3,561	6,327	49	73	51	69	74	81	65	86
Middle Atlantic	42,086	33,798	60	74	62	75	77	86	75	89
East North Central	36,040	28,304	56	73	67	75	79	86	73	86
West North Central	11,006	16,733	63	72	72	70	86	84	73	82
South Atlantic	11,634	6,368	53	67	58	65	69	69	72	84
East South Central	4,199	3,847	65	81	69	81	74	80	75	76
West South Central	7,241	5,195	57	65	57	59	73	83	71	85
Mounatin	2,150	2,707	47	65	54	50	78	88	67	90
Pacific	18,936	21,462	65	71	66	75	82	81	77	82
United States	136,853	124,741	59	72	64	72	78	84	74	85

show occupancies of 90 per cent or over. On a city basis, Minneapolis continues to show a tight situation for coolers and Omaha reported an increase of 10 points for the month to a 90 per cent level of utilization in its coolers. Cincinnati, Minneapolis, New Orleans and Los Angeles reported stocks of both frozen fruits and frozen vegetables declined seasonally during November. The 346 million pounds of frozen fruits on hand on December 1 reflected a decline of 16 million pounds for the month. Last year, there were 392 million pounds of fruits in freezers. With

TABLE III—PERCENTAGE OF SPACE OCCUPIED BY PRICATE AND SEMI-PRICATE REFRIGERATED WAREHOUSES AND MEAT PACKING

	Private and Semi-Private Warehouses						Meat Packing Establishments					
	Net Piling Space (000 Cu. Ft.)		Space Occupied—Per Cent Dec. 1, 1948		Nov. 1, 1948		Net Piling Space (000 Cu. Ft.)		Space Occupied Dec. 1, 1948		Nov. 1, 1948	
	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer	Cooler	Freezer
New England	554	1,113	28	39	31	48	1,968	725	91	100	88	.....
Middle Atlantic	3,293	4,430	62	93	64	73	6,731	740	86	71	81	65
East North Central	5,779	2,576	85	79	81	73	15,885	6,591	73	79	75	81
West North Central	2,123	3,929	91	74	93	90	25,718	10,549	86	69	88	68
South Atlantic	647	1,377	.....	31	33	92	2,377	609	94	99	95	99
East South Central	190	101	100	100	100	100	2,014	403	75	86	49	86
West South Central	700	764	100	.....	97	.....	3,570	1,452	98	100	99	100
Mountain	182	654	90	36	94	74	2,028	666	94	98	91	96
Pacific	5,383	6,554	55	63	50	60	4,056	1,152	84	82	86	82
United States	18,851	21,498	69	66	68	70	64,347	22,887	84	77	84	74

the exception of apples, blueberries, fruit juices and purees, and other frozen fruits (unclassified), all frozen fruit items were less than a month ago.

Frozen vegetables held in cold storage on December 1 amounted to 306 million pounds, down 6 million pounds from a month ago. This year's stocks of frozen vegetables are well above the 5-year average of 250 million pounds but below last year's figure of 324 million pounds.

Dairy and poultry products as a group reacted to past seasonal patterns during November. Declines were recorded for all commodities falling within this group except poultry which increased by 14 million pounds. Butter recorded a net withdrawl of 23 million pounds leaving current stocks at 60 million pounds which is above last year's holdings of 46 million pounds but 33 million pounds under average.

The decline in cheese holdings was of greater than average amount bringing stocks down to 165 million pounds from 195 million pounds recorded for November 1. The on hand quantities of cheese were slightly above average. During November shell egg stocks were drawn down by 1.2 million cases net to 454 thousand cases on hand for December 1. Last year, shell egg stocks amounted to 824 thousand cases; the 5-year average is 1.1 million cases. Frozen eggs in store totalled 139 million pounds; 30 million pounds less than a month earlier.

Mainly because of the net increase in fowl and turkey stocks poultry holdings as a group increased from 155 million pounds to 169 million pounds during the month of November. These holdings are the lowest recorded for December 1 since 1940.

The net into-storage movement of 136 million pounds of meats during November raised total stocks for December 1 to 518 million pounds. This compares with 562 million pounds last year and the 5-year average December holdings of 506 million pounds. Net accumulations during November was 40 per cent greater than average but was 20 per cent less than last year. Beef stocks amounted to 109 million pounds, an increase of 21 million pounds over last month. Pork holdings increased by 94 million pounds and totalled 298 million pounds on December 1 compared with 305 million pounds last year. Other meats and meat products of 111 million pounds were 20 million pounds greater than last month.

Storage Outlook

Cooler occupancy now at an all time record low for December should continue to drop until spring of next year. Records of cooler occupancy since 1940 show that generally, occupancy in coolers decreases from now until April, as all cooler items except cooler meats, lard and nuts are withdrawn. When shell eggs begin to move into store, cooler occupancy usually increases. However, before the low is reached in March, it is expected, if the past pattern is followed, that cooler occupancy will drop 6 to 8 points during this period.

Freezer occupancy of 72 per cent on December 1 was at a near record low—the lowest is 71 per cent recorded December 1, 1940. According to past records, on 4 occasions since 1940, freezer occupancy has increased from December to January and in these instances generally represented peak occupancy for the year. However, the peak has been reached as late as March (1944). During 1948, freezers were about 75 per cent occupied each month on the average compared with an average monthly occupancy of 80 per cent last year and 84 per cent in 1946.

Cold Storage Stocks of Selected Frozen Fruits and Vegetables

A REPORT by the Production and Marketing Administration of the United States Department of Agriculture shows that storage stocks of frozen peaches, raspberries, and strawberries declined 5 million pounds during October and on November 1 totalled 148 million pounds. Of this amount, 69 per cent or 102 million pounds were reported by package type. This total was made up of 14 million pounds of peaches, 22 million pounds of raspberries and 66 million pounds of strawberries. For these items no material change occurred in the percentage held in one-pound containers from a month ago. As of November 1, 34 per cent of the peaches, 12 per cent of the raspberries and 28 per cent of the strawberries were reported in consumer size packages. Last year these figures in the same order were 32, 13 and 34 per cent, indicating that only in the case of strawberries was there a significant difference from a year ago when a larger share of that item was held in retail units.

Packaging data on the selected frozen vegetables indicated that on November 1, 55 per cent of the 148 million pounds classified as to container size were in one-pound packages. This compared with 48 per cent last month and 52 per cent last year. Retail packages amounted to 81 million pounds on November 1, an increase of 7 million pounds over the reported holdings on October 1. Frozen green peas in consumer-sized packages accounted for this net increase; the other vegetables in consumer packages were not significantly different from last month. Retail packages of green peas comprised 59 per cent of the stocks reported whereas only 47 per cent were in retail packages last month. However, a greater portion of the stocks of asparagus and spinach were in consumer packages than any of the other frozen vegetables. Vegetables reported in other than one-pound packages totalled 67 million pounds, down 15 million pounds from last month. All vegetable items in the larger sized packages decreased.

COLD STORAGE STOCKS OF FROZEN FRUITS AND VEGETABLES IN STORAGE NOVEMBER 1, 1948 IN PACKAGES OF ONE POUND OR LESS (000 OMITTED)

	Peaches		Raspberries		Strawberries		Asparagus		Beans, Lima		Beans, Snap		Corn		Peas		Spinach	
	lbs.	%	lbs.	%	lbs.	%	lbs.	%	lbs.	%	lbs.	%	lbs.	%	lbs.	%	lbs.	%
New England	305	40	95	7	1,902	34	291	79	837	73	709	70	442	70	3,799	83	171	84
Middle Atlantic	745	28	227	6	2,940	21	498	49	4,068	51	2,071	36	1,137	20	6,347	47	750	59
East North Central	852	33	502	20	3,200	31	601	69	3,672	63	1,159	56	1,082	42	4,194	57	752	78
West North Central	475	31	361	25	2,280	41	296	56	2,037	51	426	33	1,200	36	8,067	75	184	80
South Atlantic	248	19	45	21	807	24	318	73	1,309	65	342	37	312	67	1,171	59	149	65
East South Central	40	28	1	12	82	5	5	38	44	59	.....	..	20	77	32	74	3	60
West South Central	171	31	88	56	760	25	78	75	639	85	164	74	146	58	349	65	128	92
Mountain Pacific	2,800	41	1,278	11	6,535	29	1,078	58	5,665	56	3,138	59	1,979	28	17,576	56	1,287	84
United States	4,944	33	2,718	12	18,635	26	3,433	56	17,744	53	8,848	50	6,454	32	34,655	47	2,801	65

New Method of Applying Refrigeration Adapted to Cold Storage Building

IN COLD storage construction the latest step to reduce defrosting troubles, save space and maintain even temperature distribution is to place the refrigeration coils inside the roof. The users of this "concealed" evaporator surface declare that it provides an additional advantage through reducing the cost of the structure.

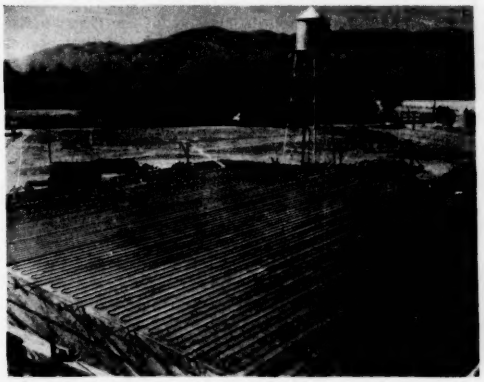


Fig. 1—The half inch coils were placed on the aluminum sheets before the corkboard was applied.

The new cold storage building is at Coachella in the Imperial Valley of California where it will do double duty as a 4000 ton ice storage part year and as a date storage in the alternate season. It is an addition to the existing plant of the Imperial Ice Division of the California Electric Power Co.

Structural Details

The storage room 96 x 98 x 30 ft. 6 in. clear height is basically a standard mill type construction using 2 in. siding and 2 in. roof sheathing with 4 in. corkboard on the walls and floor and with 5 in. corkboard on the roof. Corkboard on the walls and on the roof is applied outside the sheathing to form an envelope. The exterior finish of the walls is corrugated aluminum installed with corrugations vertical and held in place by galvanized nails driven through the corkboard and into the wood siding.

Fig. 2—The liquid and suction connections rise to the coils in the roof. The liquid feed is controlled by a thermostatic expansion valve on each liquid riser and hot gas connections are provided to facilitate blowing oil out of the coils.

The area is noted for its high temperature as well as the large volume of important agricultural products it grows and ships to distant markets. For instance roof temperatures often reach 160 F or higher and pose quite a problem in the design and operation of low temperature structures. To offset this heavy roof refrigeration load it was decided to install "interceptor coils" on the roof of the storage building.

The interceptor coils were installed concurrently with the building erection. A layer of flat aluminum sheet was placed directly on top of the roof sheathing to form a coil base. Next 9400 lineal feet of ½ in. pipe space 12 in. centers and arranged in 24 coils was securely anchored to the aluminum sheets. Then a mop coat of hot asphalt was applied.

Fig. 3—The interior view shows the wall construction and ceiling supports and the three sets of coils placed along the wall posts.

The first course of corkboard was beveled on the edges to fit between and over the pipe coils, forming a smooth surface to receive the second course of corkboard. Both courses of corkboard were dipped in hot asphalt and a mop coat was applied on top of both. Built-up roofing with an aluminum cap sheet protects the roof cork.

Since the interceptor coils are sealed in the corkboard, there is no frosting of the coils. Hot gas connections are provided so that the coils can be blown out yearly to remove any accumulation of oil. Thermostatic expansion valves located above the roof of the adjacent storage rooms control the ammonia feed to the coils as shown in the accompanying pictures.

Water Coils

To take care of wall and door infiltration and losses, as well as storage load, three sets of Gay-Clancy wall coils were installed on the walls as shown in the picture. The wall coils consist of approximately 2400 lineal feet of

¾ in. pipe prefabricated in heavy gauge steel sheets and installed flat against the wall posts with drip troughs under. In fabricating these coils the steel sheets are partially bent to receive the pipe. The pipe is secured to the sheets with welded and screwed clamps and sealed with asphalt. Occasional defrosting of these thermostatically controlled coils is required. The drip troughs prevent the defrosting condensate from getting onto the dates.

To provide artificial air circulation required during the date storage season, three 10,000 cfm. squirrel cage fans were installed on the walls of the room.

The storage room will be used from the first of the year until midsummer for ice storage and then dates are stored until Christmas. Along one side of the main storage room is an insulated non-refrigerated date receiving room 20 x 98 x 14 ft. high, serving as an anteroom. Both floors are at the same level and at truck platform level to facilitate the date handling by truck.

In order to handle the refrigeration demands occasioned by the varying date load, the compressors were interconnected with bypasses resulting in very flexible and satisfactory operation. In pre-load tests the temperature within the storage room was held at 20 F. while the outside temperature (in the shade) was 120 F. each day.

G. H. Lampkins, manager of the Imperial Ice Co., with offices at El Centro, Calif., supervised the installation, and worked closely with the Gay Engineering Corp., of Los Angeles, in the design and installation of the evaporator surface, as well as the complete building. It is estimated that a saving of more than 5 per cent in overall cost was made by the different type of cooling surface installed in this new storage.

Plant equipment includes two Gay ice freezing tanks of 90 tons total daily ice capacity and four motor driven Vilter ammonia compressors of 162 tons total refrigeration capacity. A Gay cooling tower is located on the roof above the older section of the plant. The original facilities included two date storage rooms and one ice storage room.

The new storage was constructed by the Gay Engineering Corp. and the corkboard was furnished by the Armstrong Cork Co.

Southwestern Chapter NARW

THE SOUTHEASTERN Chapter of the National Association of Refrigerated Warehouses held a meeting in Birmingham, Ala., December 1 and 2, 1948. This was the first meeting of the chapter in many months. The principal reason for the time and place was to tie this meeting in with the Southeastern Training Conference of the Refrigeration Research Foundation, which was held in Birmingham on December 1, 2, 3 and 4. Approximately fifty cold storage men from the Southeastern area were in attendance for both sessions.

The chapter session began with a reception on Wednesday evening given by the Birmingham Ice & Cold Storage Co. This was followed by a chapter dinner at which all training conferees were invited and in attendance. Special guests at the dinner were speakers addressing the conference, plus J. R. Shoemaker, Elmira, N. Y.; Allen Rushton, Birmingham, Ala.; General Richard Donovan, retired, Dallas, Tex.; and H. C. Diehl, director TRRF, Berkeley, Calif. W. A. Moore presided at the dinner and introduced Wm. Dalton, executive vice-president of NARW, as the speaker of the evening.

A business meeting of the chapter was held the following day at which time the present refrigerated warehousing problems in the Southeast were discussed and new officers were elected. They are:

Chairman, T. E. McCrary, Memphis Cold Storage Warehouse Co., Memphis, Tenn.; Vice-chairman, B. A. J. Mosey, United States Security Warehouse, Columbus, Ga.; Secretary, C. A. Martin, Jr., Noel & Co., Inc., Nashville, Tenn.

It was decided that regular meetings of the chapter would be held at least twice a year and the new officers were given full authority to "reactivate" the chapter's activities and coordinate it with the expanded operations of the NARW.

Refrigerated Storage for Pecans

FOLLOWING three years of research, Dr. J. G. Woodroof, head of the food department of the Georgia Experiment Station, announced he is convinced that pecans can be kept satisfactorily in cold storage for as long as a year. This means of solving the problem of a surplus crop of pecans apparently has been overlooked, he said.

Dr. Woodroof estimated that 10,000,000 lbs. of pecans can be kept in commercial cold storage facilities. He pointed out there are 18 commercial cold storage plants and 140 freezer locker plants in Georgia. He added that "many thousands" more pounds could be kept in home freezers.

"The high food value and the present low prices for pecans justify much wider use of cold storage than at present is the case," he declared. "Usually, a light crop follows a heavy one, and this year's has certainly been heavy. Through cold storage, a good bit of the crop could be used to fill in next year."

The following three ways of storage were outlined:

1—In the shell. Nuts should be allowed to dry a few days, then placed in cloth bags, and kept in a dry room at temperatures of 45 F or lower, at relative humidity of 80 per cent or less. After removal from cold storage, pecans may be shelled and used as fresh nuts.

2—Pecans may be shelled and the meat dried, then packed in moisture proof containers, and stored at near freezing temperatures.

3—"A probably novel way"—pecans may be shelled, the meat broken, and placed in glass or tin containers, then covered with a 60 per cent sugar syrup, and frozen. Chocolate syrup can be added.

For home or commercial use, he said, this way makes an excellent topping for ice cream, or for use in bakery products.

Cold Storage Advisory Committee Reviews Industry Problems

THE Cold Storage Advisory Committee held its second meeting on December 9 and 10, 1948. Nine members of the committee were present. The committee considered problems of commodity refrigeration on the farm, in transit, storage, wholesaling, retailing, and in the home. It also gave consideration to problems of the frozen food locker industry and problems related to the preservation and marketing of frozen foods.

At the meeting, the committee took the following actions: 1—Reviewed the work on cold storage initiated under the Research and Marketing Act of 1948 and 1949. The committee expressed general approval of the work underway and made specific recommendations for 12 projects. 2—Made recommendations regarding new work for the 1950 program. Those recommendations are listed, in order of priority, under Utilization and Marketing.

The Refrigerated Warehousing Industry

Pacific States Cold Storage Warehousemen's Association

THE Pacific States Cold Storage Warehousemen's Association convened again in annual convention at the Fairmount Hotel, San Francisco, October 21-22. This was the first regular membership meeting since 1941. It also was a combined meeting with a regional meeting of the National Association of Refrigerated Warehouses. Refrigerated warehousemen were present from all sections of the West Coast and an interesting program was presented including reports of association officers and representatives of the National Association, discussions of legal questions, and research projects.

Officers Report

In an address of welcome, Harlan Nissen, past president of the National Association of Refrigerated Warehouses and president of the American Warehousemen's Association, called attention to the need for a service performed by trade associations which provide a combined force and a greater unification of interest.

In his annual address, president R. J. Bailey recalling that this was the first post-war convention of the Association, said it was encouraging to note the ever-closer cooperation between all warehousemen for the common good of all. Since the last annual convention, he reported that a number of group meetings had been held at which the business of the association had been carried on and studies made on "bread and butter" issues facing the industry.

The report of L. A. Bailey, secretary-manager, reviewed association activities since 1941 and briefly outlined the program for the future. Their relations with the California Public Utilities commission, he said, had shown the necessity of providing basic facts on the break-down of costs and warned that this will be successful only to the extent that the preliminary spade work is done.

He touched briefly on public relations and research stating that these are important in maintaining a high occupancy in a declining market. As public acceptance gains ground, he said, new responsibilities are created because the standard of service must be kept up to a state of perfection expected by the critical public. The association, also, he said, is keeping in close touch with legislation.

National Representatives Speak

William Dalton, executive vice-president of the National Association of Refrigerated Warehouses, presented an interesting discussion on the activities of the Association office, members and staff during the year. Of general interest in his report was the new public relations work providing information to the members on employee relations, and all-around business building, a part of this work being accomplished by the new "Pacer" committee. Other activities include meetings, publicity in various trade publications, and bulletin service to members.

The program for future work, he said, will be along the same line with constant emphasis, however, on a need for active merchandising of refrigerated warehouse space. Incidentally, he said, the entire program of the 58th annual meeting to be held in San Francisco, February 7-10, will be pointed strongly toward this subject.

Edgar M. Burns, president of the National Association said he thought an excellent job was being done by the National Association under the direction of Mr. Dalton. Regarding direction of National Association work, he said, he had no plans except those that had been outlined by Mr. Dalton. He touched briefly on employee relations, pointing out that much good will be created among employees if the company would let them know more about its problems and plans.

One of the important current developments to which Mr. Burns called attention was that the Department of Agriculture, through its Marketing Research, is making surveys for the purpose of establishing marketing centers or, in other words, cold storage warehouses in locations where the survey showed they were needed. This, he said, provided a very strong potential competition and, in many instances, they could be stopped by showing that adequate service is already available.

Officers Pacific States Cold Storage Warehousemen's Association

President, Ludvig Ubbe, Los Angeles
Vice-president, Hyland Hinman, Oakland
Vice-president, Glenn Dodson, San Jose
Vice-president, Paul Henningsen, Portland, Oregon
Vice-president, J. B. Dunbar, San Diego
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"Overtime on Overtime"

A discussion of the recent Supreme Court decision that wage premiums paid for work on Saturdays and holidays, or overtime hours, must be considered the regular rate as a basis for calculating overtime payments was presented by J. Hal Cowan of the Distributors' Association of Northern California.

Mr. Cowan discussed this law and the court decision in considerable detail. He explained that pay for work on Saturdays and Sundays also evening work following a regular day, under a recent administrator's ruling, is not considered as premium pay. For holidays, however, it is considered premium pay and must be figured as such.

Harlan J. Nissen told about a law-suit which seriously affects the refrigerated warehousing industry. It concerns a court decision on storage of products of a West Coast frozen foods packer which upsets the usual procedure in regard to the validity of negotiable warehouse receipts once the customarily accepted principle regarding a warehouseman's primary lien on products. Mr. Nissen said the entire industry is interested in the outcome of this case.

He also announced that while considering preparation of a standardized procedure in such cases, they had discovered that this work was already being done on a more elaborate scale by the American Law Institute, subsidiary of the American Bankers' Association.

Mr. Nissen then, speaking on the subject assigned in the program, "Good Packaging," repeated a talk he had made at the Packaging Institute, Inc., New York City, summary of which was published in the November, 1948, issue of ICE AND REFRIGERATION. Mr. Nissen said the members of his audience had been very much interested; one of the comments being that this was the first time they had heard a warehouseman talk about anything but rates.

An interesting round-table discussion was held on the subject of palletizing operations led by Leon Bailey and participated in by Glenn Dodson of San Jose, F. O. Cooke, San Francisco. Harlan Nissen and others.

The subject of cost finding was discussed extemporaneously, being led by Mr. Bailey, during which the method used by a group of Chicago warehousemen was explained and the general consensus was that some similar method might be used by the warehousemen in the Pacific States Association. Following the discussion, it was decided to appoint a committee for the purpose of making an investigation and presenting a recommendation on this question at the next meeting in January.

Reporting for the special committee appointed to investigate the subject of air purification, Dr. H. C. Diehl, stated that the subject of atmospheric control in refrigerated storage has been found to be important along with factors of temperature and relative humidity. While it is not a cure-all for commodity storage problems, and likely never will be, it is of considerable importance.

He then discussed the subject of air purification by activated carbon, outlining its basic considerations. Presentation of this report was followed by considerable discussion, many of the members giving their experiences in the use of activiated carbon. A brief summary of this report was published in the December, 1948, issue of ICE AND REFRIGERATION.

Report on Investigations

Prof. F. W. Allen of the University of California reported on more recent results from the storage of plums. In this work, Prof. Allen said they had held a number of varieties for given periods, some of them at different temperatures. and the results showed how much ripening occurred and how they change in color. The higher the temperature, the more apt they are to ripen. Results of this study were shown in a series of slides.

Dr. M. A. Joslyn of the University of California gave a report on the study of storage deterioration of frozen foods. Dr. Joslyn said that frozen foods can stand a lot of punishment. but said more information was needed on how to check deterioration. This information is particularly needed now that frozen foods are not turning over as rapidly and are being kept longer in freezer storage. Present knowledge indicates that storage of about zero F. is economically satisfactory even if it is not technologically ideal for the preservation of all frozen foods. What is needed, he said, is more accurate information as to actual storage life of any given commodity at any given temperature.

W. T. Pentzer of the United States Department of Agriculture, Fresno, presented a report on pre-cooling grapes in tunnel coolers. This report showed, among other things. results obtained from the cooling tunnel in which ice was used instead of mechanical refrigeration. The grapes were cooled to 20 to 30 F. in the tunnel and again 5 to 10 F. after they were loaded in the car. The main reason for pre-cooling grapes quickly is to keep them from losing moisture and from developing decay. Other fruits that soften and become over-ripe in transit such as pears, apples, peaches and plums would show additional benefit from quick cooling by checking the ripening process. A brief summary of this report was published in the December issue of ICE AND REFRIGERATION.

Dr. John Matchett, Food Research Coordinator of the Western Regional Research Laboratory, Albany, explained that this laboratory has projects going on relating to the three principal methods of food processing; freezing, canning and drying. Regarding frozen foods, most of the problems are concerned with the quality of frozen food as it reaches the consumer, and consequently have to do with all phases of its preparation and storage.

The subject of liens, legal title on transfers to another account, was discussed by Glenn Dodson. Mr. Dodson explained that this problem had arisen from the unfavorable financial condition of the frozen foods industry on the West coast which had made it necessary for refrigerated warehousemen to find the proper methods of handling releases on goods. A legal study was made of the subject following which a general order was issued by Mr. Dodson's company which outlines the procedure to be used. These instructions were distributed in mimeographed form to members of the session following which Mr. Dodson explained the details and there was considerable general discussion.

Limited Liability

The question of limited liability of warehousemen for loss or damage to stored products and protective forms for warehouse receipts was discussed by Reginald Vaughan, an attorney from San Francisco. Mr. Vaughan discussed the theory under which a warehouseman is allowed to limit his liability for loss or damage to property under his custody and the procedure to be followed when the storer sues on the ground that the warehouseman was negligent. He said that as a protection under the limited liability provision as well as the 30-day notice of claim provision, it is important that the storer have actual knowledge of both provisions. These two provisions, he said, should be inserted conspicuously on each warehouse receipt and hand tag.

Deciduous Fruit Advisory Committee

AT A two-day meeting ended December 15 the Deciduous Fruit Advisory Committee reviewed research and service work that is now in progress on deciduous fruits under the Research and Marketing Act and presented its views concerning the continuation of such work and what new research or services should be undertaken during fiscal year 1950.

New lines of work considered most important by the Committee in the field of deciduous fruit marketing and services are: (1) The collection and reporting of current data on stocks of processed fruits and of certain fresh fruits such as apples and pears on hand by wholesalers, and to make spot checks covering stocks of these items in the hands of retailers; (2) obtain data on the financial condition of transportation agencies in order to compile and maintain current data to determine whether or not general freight rate increases are justified; (3) develop improved methods for determining the best maturity condition for harvesting and marketing fresh fruits as a means of assuring top quality when this produce is offered to the consumer; and (4) to obtain estimates of the probable weekly movement to market, by state or regions, of the principal soft fruits.

In considering which of the marketing research and service projects now under way should be continued or expanded the Committee gave top priority to the training of retailers in improved methods for handling and merchandising fresh fruits and vegetables; development and promotion of more efficient market facilities for handling farm products at concentration points, and at terminal and secondary markets; achieving greater efficiency with a view to lessening the cost of transporting farm products to market; and reducing waste in marketing channels through the development of improved packaging materials and loading methods.

The Ice Industry

National Association of Ice Industries

Executive Offices
1706 L St. N. W., Washington 6, D. C.

PRESIDENT
M. J. Garvey, St. Joseph, Mo.

EXECUTIVE SECRETARY
Mount Taylor, Washington, D. C.

Ice Industry Reviews 1948—Looks Toward 1949

THE following review of the ice industry for 1948 has been compiled from letters received from ice distributors in representative sections of the country. Outstanding is the fact that ice sales were down, in some cases a considerable amount, in others a lesser volume and in only a few instances there was no reduction. In general however these reports indicate that sales as a whole came close to the national average of 12.1 per cent under 1947.

Other points covered show less shortages than usual, generally increased prices and costs, a slightly improved manpower situation but gloomy forebodings for 1949, a heartening increase in sales of processed ice with still better prospects for 1949, refrigerator and appliance sales still in the war doldrums, recognition of the necessity but not the desirable enthusiasm for advertising, and diverse opinions and suggestions regarding what should be done and the outlook for 1949.

Ice Sales for 1948

ICE sales were down as compared to 1947. That fact is clearly evident from all reports; in fact it is almost unanimous, only two companies reporting the same or slightly larger sales. While figures vary, as a whole they seem to reflect the national average of 12.1 per cent decrease. The figures quoted are tonnage volume; the price volume is, generally, about half of that.

Alabama—Gross sales for 1948 declined less than 2½ per cent over those of 1947.

Toronto, Canada—Ice sales have steadily mounted in this city and in spite of a somewhat backward summer sales were about 3 per cent over the year previous.

Colorado Springs, Colo.—Our ice sales in 1948 were approximately the same as in 1947.

Denver, Colo.—Sales of ice were, on the whole, about 15 per cent off of 1947. There were a few spots in Colorado where tonnages were 50 per cent off.

Pueblo, Colo.—Our total tonnage was off approximately 12½ per cent. This loss of tonnage was due in main to general business conditions in this territory and to mechanical refrigeration.

Stamford, Conn.—Ice sales for 1948 showed a decrease in tonnage of approximately 20 per cent. Dollar value of sales was somewhat better, being off only about 10 per cent. This was due to a better average price because of an increase in sales of processed ice.

Washington, D. C.—Our sales for 1948 as compared with 1947 were 8 per cent less.

Atlanta, Ga.—Our ice sales for 1948 were down 12 per cent compared to 1947.

Griffin, Ga.—Our total ice sales showed a slight increase over past years.

Clinton, Ill.—Ice sales in Illinois generally were off about 20 per cent.

South Bend, Ind.—Tonnage for 1948 as compared with 1947 was off about 20.7 per cent at the end of November.

Vincennes, Ind.—Ice sales up to December 1, were approximately 12½ per cent below 1947.

Centerville, Iowa—Sales were down approximately 14 per cent. It was one of those short ice seasons to which much of the decrease can be attributed. However some was the result of more mechanical refrigerators. Throughout our territory there are several poultry dressing plants that use a considerable amount of ice. As the supply of poultry was short in this section, the sale of ice was curtailed through decreased poultry dressing and car icing.

Oelwein, Iowa—Sales of ice were down about 5 per cent.

Manhattan, Kans.—The volume of ice sales in Kansas was down about 12 to 20 per cent, weather being the principal cause.

Richmond, Ky.—Sales of ice for 1948, due largely to the weather, were about 10 per cent below 1946 and 1947.

New Orleans, La.—Our 1948 sales exceeded any previous year and was ahead of last year by about one per cent. The first eight months showed a consistent gain over the year before, being about 4 per cent ahead. During September and October, weather conditions were not as favorable and sales dropped, but at year's end, we were still ahead.

Somerville, Mass.—Sales of ice were down about 15 per cent, the poorest since 1943.

Eupora, Miss.—Our ice business was about the same as in 1947. It started off better in the early part of the season but in August we had a cool, wet spell which cut sales considerably, but business recovered the latter part of the season and fall sales were better than the fall of 1947.

Columbia, Mo.—Our ice sales were about 12 per cent off from 1947.

Syracuse, N. Y.—Our sales were off in 1948 about 18 per cent in tonnage and 10 per cent in dollar value. This was due largely to weather conditions and tightening up of spending.

Oklahoma City, Okla.—The 1948 sales were down from 7 to 19 per cent under those of 1947 and previous years.

Klamath Falls, Ore.—During the war years there was a heavy demand for additional ice on the west coast and especially here. Icing of refrigerator cars at this point accounts for the bulk of our ice sales during the year. Our peak production year of all time was 1947 but the tide seems to have turned in 1948 and during the last half we dropped off in ice and storage business approximately 70 per cent making our total year drop off of about 40 per cent from the business of 1947.

Portland, Ore.—Ice sales were off about 20 per cent this year compared with last.

Sharon, Pa.—Ice sales were down.

Corpus Christi, Tex.—Our ice sales for the year were a little under 1947 and several previous years.

Sumter, S. C.—Our ice sales for 1948 increased about 2½ per cent.

Danville, Va.—Our sales were off about 10 per cent for the year. In the spring we were ahead but the season broke on August 5 and we had only a few days of ice weather thereafter.

Tacoma, Wash.—Our ice sales were down about 5 per cent from the 1947 figure.

Shortages Decline

ICE distributors were not bothered to any extent during 1948 by shortage of ice. Decreased tonnages was the chief factor and increased production facilities in some cases alleviated what, for the last few years, was a bad situation. Where shortages did occur needed supplies were obtained without difficulty.

Alabama—We did encounter a temporary ice shortage, but only once, during a heavy vegetable shipping period and it lasted only 21 days last July. We own two excellent pieces of hauling equipment, one 18 tons and the other 10 tons capacity. With them we hauled ice at night during our peak season and never failed to render service to our customers.

Colorado Springs, Colo.—We did not have any shortage of ice in the summer of 1948.

Denver, Colo.—Because of reduced sales, there was no shortage of ice but rather considerable tonnage carried over, especially of natural ice.

Washington, D. C.—We have an ice shortage every year even though we increased the size of our plant two years ago with a 10x10 compressor and intend to increase it again this year. We usually haul our surplus ice from Baltimore, about 34 miles from our plant.

Griffin, Ga.—We were able to meet our customers needs during the entire summer of 1948.

Clinton, Ill.—We had no ice shortages during 1948.

South Bend, Ind.—Since both South Bend ice companies have installed new tanks in 1947 and 1948 this market has ample supply to more than meet our normal ice requirements without having to purchase from outside sources. We feel that our shrinkage in tonnage is largely due to the exceptionally cool season that we have had during 1948, and if we have normal temperature or above during 1949, we anticipate about our normal tonnage.

Vincennes, Ind.—We had no shortage of ice in 1948.

Oelwein, Iowa—We had no shortage in 1948.

Kansas—Small plants, which normally draw upon the larger plants for supplementary supplies during the summer months, were this season able to meet their own needs. Companies supplying these smaller plants, therefore, showed sharper decline in volume. Also registering larger declines than the average were those plants which normally ship carlot ice to railroads, which this season found their contract ice adequate.

Richmond, Ky.—Because of reduced sales, we had ample ice during the summer of 1948.

Baton Rouge, La.—During June, July and August sales exceeded production, but there was no shortage to the trade, as a sufficient supply of ice was available from outside sources. Especially during July was the production shortage acute, as the month was abnormally warm. There has been a shortage of ice in this locality during peak periods since 1943, but this condition will be corrected next year, as additional production capacities of about 175 tons has been, or are being, installed in our trade territory since our past peak demand.

Somerville, Mass.—We had no shortage of ice during 1948.

Eupora, Miss.—We had a slight shortage in July on wholesale ice but were able to take care of our retail trade. Expect to have a slight increase in capacity for next year.

Columbia, Mo.—We had a surplus of ice during the past summer.

Klamath Falls, Ore.—In an endeavor to keep up with the demand, we added an additional ice tank in 1943 and another in 1945 so that our output was double pre-war production. Up to 1948 we were hard pressed to meet the demand for ice each season but that year we found ourselves at the end of the season with 2500 tons of ice in storage which must be carried over.

Oklahoma City, Okla.—We did not have any shortage of ice.

Portland, Ore.—Our ice supply was adequate at all times.

Sharon, Pa.—We experienced no ice shortages during the summer of 1948.

Corpus Christi—There was no shortage of ice in this area. A few towns had an increase in sales due to a combination of circumstances but ice was obtained from nearby towns, so there were no shortages. We do not anticipate any shortages during the coming year.

Danville, Va.—We did not have any shortage, in fact, it was necessary for us to slow down production after August.

Tacoma, Wash.—There was no ice shortage this past year and we anticipate none in 1949.

Increased Prices and Costs

INCREASED prices appear to be standard practice, some distributors having made such adjustments prior to 1948. Of the others, the majority seem to have established nominal increases while a few continue with their old rates. Regarding costs, they have gone up, in all cases, and in most instances they are considered as out of line with income.

Alabama—Our retail and commercial prices remained unchanged but car icing rates advanced 30 to 50 per cent in some sections. Costs on nearly all items, except electricity advanced about 20 per cent and this, coupled with a slight decline in high revenue retail volume, caused a decrease in cash receipts.

Toronto, Canada—One element in our increased sales to domestic trade may be the fact that in the face of rising costs there has been no increase in price here since 1941.

Colorado Springs, Colo.—We increased the price of ice approximately 10 per cent. Our costs are out of line with income as compared with previous years.

Denver, Colo.—Prices were increased about 8 per cent. This increase was not sufficient to take care of the increase in wages plus the poor quality of help.

Pueblo, Colo.—We have increased our prices this year 7½ per cent, but this did not entirely take care of the increased costs. Costs were up about 10 per cent.

Stamford, Conn.—There was no increase in our prices during the year, and very little increase in cost, excepting power, which showed approximately 15 per cent increase.

Washington, D. C.—Our prices were increased during the year 31 per cent.

Atlanta, Ga.—Costs were up ten per cent.

Griffin, Ga.—As yet we have not increased the price of our retail ice. We would, however, have to increase slightly the price of our wholesale delivered ice because of increase in delivery expenses. Operating costs, of course, have risen with us as it has with all other firms.

Clinton, Ill.—Our prices were increased about 10 per cent.

South Bend, Ind.—We did not increase our ice prices during the past season nor do we anticipate any increase in 1949. Our costs for 1948, however, were higher than we have had for several years due to the smaller tonnage. With the wage scales we are paying and the high overhead that we have, in order to get a favorable cost per ton we have to have at least normal volume of business or better.

Vincennes, Ind.—No major price increase was made. Minor adjustments were made in price of bulk crushed ice from 5 to 10 cents per 100 lbs. over block ice prices. Prices of sized ice in small bags were increased 12½ per cent per bag. Large bags were increased 15½ per cent per bag. Costs, in line with income, were higher than in previous years.

Richmond, Ky.—We increased our prices approximately 10 cents per 100 lbs. at the close of 1947, which helped to offset the decrease in tonnage. Under our new schedule of prices, domestic ice is now 70 cents. Costs continued to increase during 1948 faster than income, despite the price increase. However, in our opinion, a normal ice season would have produced sufficient income to offset such cost increases.

Baton Rouge, La.—No changes have been made in our prices during the past two years, and none are contemplated now, although costs have increased at a greater ratio than sales, and our net position this year is not as good as last.

Somerville, Mass.—We did not increase prices during 1948.

Eupora, Miss.—The only change in prices was an increase of 10 cents per 100 lbs. There was a slight increase in costs due to increased cost of labor.

Klamath Falls, Ore.—Our costs were a little out of line with income in 1948 when considered against the past ten year picture. Costs took a bigger percentage of the income. We did not raise prices during 1948 although we expect to get a slight increase on one of our large contracts during 1949.

Portland, Ore.—The price of ice was not increased this year. Our costs are higher than last year compared with income.

Sharon, Pa.—We did not increase prices during 1948.

Sumter, S. C.—We did not increase prices during 1948. Our costs were in line with income.

Corpus Christi, Tex.—Prices on domestic and commercial ice were unchanged as compared to 1947. Costs increased due to higher wages to labor.

Danville, Va.—Having advanced our prices before last year, they remained the same.

Tacoma, Wash.—We made a slight price adjustment this year, an increase of $1.00 per ton in the wholesale price to venders and ice stations, also in the price of sized ice of 10 cents per cwt., and in quantity purchases over 200 lbs. This, we hope, will assist in bringing our income in line with operating costs.

The Help Situation

THE help situation appears to be "spotty," good in some cases and unfavorable in others, although as a whole better in 1948 than in previous years. For 1949 views incline toward the pessimistic but with the hope that there will not be a return of the employment problems which beset the industry during the war years.

Colorado Springs, Colo.—We were able to employ adequate help, and will not have any difficulty in 1949.

Denver, Colo.—There was a shortage of man power throughout the summer, which became very acute in the fall. The outlook for 1949 does not look favorable.

Washington, D. C.—We have been able to employ more and better help than we have in the past five years and the outlook for 1949 is better, as our employees seem to be of much higher caliber than in the past.

Atlanta, Ga.—For the most part we were able to employ adequate help during 1948 and look for an improvement along these lines in 1949.

Griffin, Ga.—Our help situation was slightly better in 1948 than in the past four or five years, but is not the caliber that we wanted to be representatives of our company. We expect to obtain a higher type man in 1949.

Clinton, Ill.—We were able to employ competent help during 1948 but the outlook for 1949 seems to indicate a shortage of manpower.

South Bend, Ind.—Even with the high rate we are paying it is difficult for us to get good help such as we would like to employ. It does not look as though our manpower situation will be any better during 1949.

Vincennes, Ind.—We have been able to employ more adequate help. Outlook for 1949 regarding manpower appears to be favorable.

Centerville, Iowa—The manpower situation was a great improvement this year. Sometimes the routeman wasn't the best calibre but we didn't have the turnover encountered in recent years. We don't have a sideline large enough to carry over many men from one season to the next. This makes it difficult to have ice salesmen rather than just ice men.

Kansas—All companies report more difficulty in maintaining competent delivery personnel this year than in the worst year of the War. There has been some improvement recently, but whether it will carry over into next summer remains to be seen.

Richmond, Ky.—Manpower was in sufficient supply for the first time since before the war, but quality continues below that required to develop the type of employees necessary to render the type of good service we would like to give our customers. We are afraid that 1949 will see a partial return of the employment problems which beset the ice industry during the war years.

Baton Rouge, La.—The labor situation was better than last year, but was still far from satisfactory. Large industries located here have been engaged in extensive expansion programs requiring considerable extra labor. The same was true of general building contractors. This caused a constant shortage of satisfactory labor. The outlook for 1949 is better, as construction and building programs are expected to taper off.

Eupora, Miss.—There was a slight increase in costs due to higher wages. The labor situation was better but still not quite what we would like. We don't look for much change in 1949.

Columbia, Mo.—We were able to employ adequate help and expect to have better help during 1949.

Oklahoma City, Okla.—We were not able to employ efficient help. It is our opinion that the outlook for man power in 1949 will be better than the past year.

Portland, Ore.—Help of a very high type is available, and we will have no trouble along that line the coming season.

Sumter, S. C.—We had adequate help and expect we will have all we will need in 1949.

Corpus Christi, Tex.—There was no shortage of help in 1948 and we do not anticipate any in 1949.

Danville, Va.—The help available was about normal and we see no reason to feel there will be any shortage during next season, in fact we expect help to be more easily available and possibly of a higher type.

Tacoma, Wash.—The labor supply remained adequate during 1948.

Processed Sales Increase

THE trend in sales of processed ice continues upward. All distributors appear to have grasped the commercial possibilities and most of them are doing a good merchandising job. The story of their success is told in the rising percentages as compared to the total volume sold.

Alabama—We sell crushed, cubed and snow ice. The volume of crushed was up 20 per cent, cubed up 15 per cent, and snow has advanced 33⅓ per cent, the latter attributed mostly to increased transport truck-icing. We are highly enthused over truck-icing, so much so that we are building an icing station, which will be equipped with a bunker-icing conveyor and a high-speed portable crusher-slinger.

Toronto, Canada—Although the trade in sized ice is growing stronger, we have lagged somewhat in the matter of the display of iced vegetables. The initial investment deters the average storekeeper from installing equipment and he relies rather on a quick turn-over of his goods.

Colorado Springs, Colo.—Sales of ice cubes, sized and crushed, doubled this year over previous years, and we expect to increase this materially in 1949.

Denver, Colo.—Sized and cubed ice is becoming more popular every day. Where sized ice is promoted, the tonnage is rapidly increasing.

Pueblo, Colo.—Our sized ice sales are 20 per cent of our total. Sized ice sales were off about 9 per cent.

Washington, D. C.—We do not sell crushed ice but do sell four sizes of screened ice, namely rice, chestnut, nut and egg. We also sell cubes. About 95 per cent of the ice we deliver from our trucks is screened or cubed ice. We crush our ice in a different manner than most ice companies as we break our ice instead of crushing it, thereby eliminating snow ice as it has no value and will not sell. By breaking our ice instead of crushing, our smallest size is in granular pieces and for that reason we call it "rice." The majority of ice companies do not know how they are crushing their ice nor do they look after the crusher because it is in the storage and no one watches it. It is very important to see that the crusher is properly operated.

Atlanta, Ga.—Our sales of sized and crushed ice were about the same as in previous years and do not anticipate higher sales in 1949. About 5 per cent of our business consists of sized and crushed ice sales.

Griffin, Ga.—Our sized ice sales has increased considerably. We have tried in 1948 to actually merchandise our crushed ice and have found that results were very gratifying.

Clinton, Ill.—We sold more sized ice in 1948 than ever before and expect 1949 sales to be still better.

South Bend, Ind.—Our crushed and sized ice business during 1948 is up as compared to 1947 and right at the present time about one-third of our delivered tonnage is crushed ice, sized ice and cubed ice. This increased demand comes from the number of iced vegetable cases sold during the past two years.

Vincennes, Ind.—We sell sized ice and crushed ice. Sales compare favorably with previous years and show an increase. Crushed and sized ice sales will run approximately 20 per cent of all ice sales, exclusive of wholesale sales to dealers. We anticipate crushed and sized ice sales will increase steadily in 1949.

Centerville, Iowa—Our crushed ice sales amount to approximately 12 to 15 per cent of our retail sales and haven't changed any appreciable amount. Drug stores, restaurants, water coolers and the hospitals still make up the bulk of our crushed ice customers.

Oelwein, Iowa—We sell sized and crushed ice and the sales are up over previous years. We expect to sell more in 1949.

Kansas—There is great interest in vegetable icing. The larger companies have done a magnificent job in exploiting this new field. The rank-and-file are just catching on. While progressive action in sized ice, packaged ice, ice vending machines, equipment sales, etc., was scattered and irregular the past year, the movement forward is likely to occupy a broad front in 1949.

Richmond, Ky.—Our company sells sized ice and during 1948 our sales of such ice showed further gains. Approximately 10 per cent of our total tonnage sold was in the form of prepared ice, which figure we expect to better in 1949.

Baton Rouge, La.—We sell some crushed ice, but no sized ice. Our sales have been steadily increasing without any special effort on our part. However, we are now better prepared to handle this class of ice and expect to put a lot of effort into its sales in the future. Our sales of crushed ice are now about 15 per cent of commercial business.

Somerville, Mass.—About 10 per cent of our sales are in the form of sized ice and we expect 1949 to show some increase.

Eupora, Miss.—Our crushed ice business is very small but we do sell some and in 1948 there was a slight increase.

Columbia, Mo.—We sell sized ice and sales are increasing and should continue to increase.

Syracuse, N. Y.—We will put more effort on the selling of ice cubes and ice in prepared sizes. This phase of our business has shown a steady increase.

Oklahoma City, Okla.—We sell sized ice and the sales were up 82 per cent over 1947. About 7 per cent of our 1948 sales were in this form and we expect a much larger volume in 1949.

Klamath Falls, Ore.—Our local retail and wholesale ice business is handled through another company who buy scored ice from us and deliver from our platforms. They handle crushed ice but not sized ice. While total business was off 25 per cent, crushed showed a slight increase.

Sharon, Pa.—About 10 per cent of our sales are in the form of sized ice but they were down in 1948.

Corpus Christi, Tex.—The sales of crushed ice holds steady, making probably about one-third of our commercial and domestic sales.

Danville, Va.—There was a slight increase this year in sales of crushed ice, but the percentage of this type to our output is negligible. It is hoped we can have more of the business in the coming year. The cost of handling is such that it is being sold for less than block ice, we figure, and were it not for the use of returned ice it would be less desirable.

Tacoma, Wash.—Crushed and sized ice is still new and in the experimental stage with us. We have three grades—snow, crystal and cocktail sizes, sold in 50 lb. wet strength paper bags. This has proven satisfactory and we expect more volume in this field.

Refrigerator and Appliance Sales

REFRIGERATOR and appliance sales continued through 1948 although sales in many instances were off as compared to previous years, partly as a result of the war's disruption. Generally speaking, it is expected that 1949 will show better results.

Alabama—We sell ice refrigerators, portable picnic coolers, thermos jugs, water coolers, etc. Our cooperative plan with Coca-Cola on merchandising picnic coolers has really paid dividends. Our general ice-appliance sales plan for 1949, while not elaborate, will work, we think, because of a new inspired enthusiasm we are trying to drive home among our whole personnel and a blanket 10 per cent commission incentive!

Toronto, Canada—Selling refrigerators of good quality and design is the best guarantee of the continued use of ice and its extension to a longer period of the year. Length of service is a more

important consideration than an increase in unit price, as it is the annual revenue per customer that builds tonnage. Along with ice refrigerators we display a line of electric appliances which has the effect of bringing people into the store to become acquainted with our merchandise.

Colorado Springs, Colo.—We have purchased hundreds of ice refrigerators which were war surplus, and are selling them at cost.

Denver, Colo.—The sale of ice refrigerators was practically nil during the war and so far there has not been any new interest developed.

Stanford, Conn.—We are selling a complete line of ice-using appliances, also some mechanical equipment, and while our sales have not been satisfactory, we believe we must continue this merchandising as the only way to increase ice sales.

Atlanta, Ga.—Concerning refrigerator and appliance selling plans for 1949, we expect to put many more employees on this phase of our work during 1949.

Griffin, Ga.—We try to stock as many types of ice-using appliances as is practical and that we have a demand for. Our appliance sales have been good. By starting the season well stocked this year we hope to do a much better job of selling than we have been able to do in the past.

Clinton, Ill.—Our appliance and refrigerator sales in 1948 were not satisfactory and we hope to do a better job along this line in 1949.

South Bend, Ind.—The sale of ice refrigerators and other ice-using appliances was down in 1948 about 40 per cent under 1947. We are anticipating an increase in the sale of ice refrigerators and other ice-using appliances during 1949 and we already have quite a large inventory on hand.

Vincennes, Ind.—We sell ice refrigerators and other ice-using appliances. However, sales in 1948 have not been satisfactory. In 1949 we plan to step up our sales training program and make a drive for more sales of ice-using equipment of all types.

Centerville, Iowa—Our ice-appliance sales lagged quite a lot below 1947. Sales to dealers were down as well, leaving us with a substantial carry-over of merchandise. We did have a nice business with water coolers early in the season.

Kansas—Most members are well aware of the fact that if we do not sell ice equipment, sooner or later we do not sell ice. Aggressive salesmanship has taken on a new lease of life.

Richmond, Ky.—We not only sell ice refrigerators but all types of ice-using appliances as well. Sales during 1948 were definitely off due to two factors, (1) the poor ice season and (2) resistance on the part of prospective purchasers which developed early last spring. Our refrigerator and appliance selling plans for 1949 contemplate more intensive employee training with resulting increased sales through our ice servicemen and plant employees. In our opinion, there is no substitute for employee education with attendant enthusiasm on the part of management and men when it comes to volume sales of refrigerators and ice-using equipment.

Baton Rouge, La.—We have not sold ice refrigerators for several years, having discontinued their sales during the war when it was almost impossible to secure them. But we are going back into the business in 1949, and have placed orders for a supply of various sizes, as well as for other ice-using appliances. We expect to put a lot of effort into the promotion of this department.

Somerville, Mass.—Our 1948 sales of refrigerators and appliances were not satisfactory but we hope to do better in 1949.

Eupora, Miss.—We sell refrigerators and other ice-using appliances when we can get them. We got very few refrigerators the first part of the season but since the season is over we got quite a few good refrigerators.

Columbia, Mo.—We sell refrigerators and other ice-using appliances, mainly through advertising and commissions to employees for sales.

Syracuse, N. Y.—We handle ice refrigerators, vegetable cases, water coolers, and expect to develop a rental plan for much of this equipment this season, and will look forward to a good year providing we have fair weather.

Oklahoma City, Okla.—We sell ice refrigerators and other ice-using appliances. Our sales were down about 40 per cent during 1948 but we are planning an intensive merchandising program for 1949.

Klamath Falls, Ore.—We are urging our dealers to sell ice refrigerators but they are not enthusiastic and say they feel that people will not buy an $80 or $100 ice refrigerator. If a cheap ice refrigerator could be put out then renters and small home owners might buy. Most of their business is to renters.

Sharon, Pa.—We are selling ice refrigerators and other ice-using appliances and although sales were below par in 1948, we have no plans for new plans for 1949.

Sumter, S. C.—We could not get enough ice refrigerators and other ice-using appliances in 1948 but hope to do better in 1949.

Corpus Christi, Tex.—We are not selling ice refrigerators, but during 1948 sold a few ice chests. We do not plan to merchandise appliances during 1949.

Danville, Va.—We have handled a few ice appliances and refrigerators, but being able to obtain only a limited number, our sales were fewer than in former years. Not knowing what to expect for 1949, we have no definite plans.

Tacoma, Wash.—We are doing a poor job of selling ice refrigerators, although we do have a few new as well as used models. We hope to increase sale of appliances in 1949.

Advertising

THE use of National advertising material is not meeting with the unanimous response that this excellent program warrants. While many are enthusiastic, others are lukewarm. However the value of advertising is recognized by all but a few and most of those who are not using National material are devising their own local advertising and personal solicitation plans.

Alabama—We will, as usual, use NIPR's advertising aids. We are highly enthusiastic on "outdoor" advertising, having in use now three "24 sheet poster" and one 40 ft. painted boards, the latter bearing our firm name in large neon letters. All are illuminated at night.

Colorado Springs, Colo.—We are not using material from the National Association of Ice Industries for advertising and merchandising activities, but are developing all of our efforts along the lines of personal solicitation.

Pueblo, Colo.—As in the past, we plan to use material from the National Association of Ice Industries for our merchandising campaign and for advertising.

Washington, D. C.—In our opinion, increased sales in the ice business cannot be done by advertising, but rather by personal contact, service and quality. We try to improve our service each year and try to give the customers something new in the way of different kinds of ice, different kinds of service, better packages, and so on. We deliver our ice in 50 lb. cotton bags which are laundered after every delivery. They are always clean and keep the men clean as there is hardly any moisture from them. When the ice melts, the water goes out through the bottom of the bag and there is no condensation as found on the canvas bags. We keep our trucks painted and clean at all times. They have covered bodies and always look well. We have a man who looks after our customers and advises them the kind of ice that is best suited for their use and how to use it.

South Bend, Ind.—We feel that national ice advertising has played a big part in helping us to sell ice-using appliances in South Bend, especially in getting our market started on the use of iced vegetable cases, and from the pre-view of the national advertising program for 1949 that we saw in St. Louis at the convention, we feel that it is outstanding and we plan to use it locally during the coming season.

Vincennes, Ind.—Material from the National Association of Ice Industries will be used in our own advertising and merchandising activities. We have no suggestion to make for improvement in the NAII program.

Richmond, Ky.—We expect to continue to use the material from the National Association of Ice Industries to background our own advertising and merchandising activities. We are so much in accord with the theme and scope of this material for 1949, as outlined at the National Convention, that we have no suggestions for adding to or improving it.

Baton Rouge, La.—We are not doing any advertising at this time, but expect to put on a sales campaign beginning early next year. It will be built around employee training and the creation of better public relations.

Eupora, Miss.—Regarding National Ice Advertising material, it really does not fit in the small town business.

The Outlook for 1949

THAT ice distributors generally are thinking about the future of their business is shown by the variety of opinions expressed as to the outlook for 1949. In general, it is favorable, but with the realization that good business will depend heavily upon continued merchandising efforts, employee training and building good public relations.

Alabama—In our opinion the following are the outstanding things the ice industry should do in 1949: 1. More wholehearted and financial support of NIPR and then follow through with enthusiastic local sales promotion and advertising activity. 2. A greater local effort in promoting iced vegetable, iced poultry and iced seafood displays, and general promotion of crushed ice in all food stores. 3. Easy, mechanized, well-located truck-icing facilities with service not price dominating the effort. 4. A widening of effort in merchandising processed ice in "one-trip" paper bags. Also establishment of deep-freeze units for dispensing packaged party ice—cubes and crushed—in drug stores, super-markets, 24 hour service stations, theater lobbies, etc. 5. More extensive merchandising on surplus ice chests, especially to owners of mechanicals who can be won back to ice if and when it is presented to them in the right form and a receptacle in their own home for receiving it. 6. We should never run out of ice! If we lose a little money by importing it for a few days, charge it off to good advertising. Give the customer plenty of ice, smile, thank him, and he'll come back!

Toronto, Canada—It seems a commonplace to say that the natural advantages of ice are realized only when a properly built and well-insulated refrigerator is used, but we believe this to be

the best foundation on which a dealer can build for the future. It should be our business to encourage manufacturers to produce such a refrigerator and then to actively promote its sale.

Washington, D. C.—Our advice is to give the customers ice as they want it, when they want it and where they want it.

South Bend, Ind.—We feel that if the ice industry is to continue selling ice refrigerators, especially domestic refrigerators, there will have to be something done in the way of producing and manufacturing a good refrigerator that has more eye appeal and better performance than anything we have had during the war or since, and at the same time to be priced no higher than $100 for a good 100-lb. domestic refrigerator.

Vincennes, Ind.—In our opinion, the ice industry generally should give close attention, beginning early in 1949, to a revival of sales training methods. As a result of various things resulting from the war and the aftermath of war, our training program has been somewhat disturbed. We feel that we should get back again to training our employees in the original ice story which we used so effectively in the early and late 30's, namely constant temperature, balanced humidity, washed odor-free air and constant one-way circulation. We believe that, in general, the ice industry has not been telling this story often enough to its potential customers.

Centerville, Iowa—Our two foremost problems of the coming year are to hold the line on the cost of ice produced and to get our ice appliance merchandising program to produce sales.

Richmond, Ky.—The ice industry should continue to improve its customer service in 1949. More ice companies should sell sized ice and all ice companies should sell ice refrigerators and ice-using equipment. Likewise, all companies should support the 1949 National Ice Public Relations Program for "if they're gonna be sold, they gotta be told." Then if we are favored with good ice weather, the ice industry has nothing to fear in 1949. In our opinion, the most important thing ice distributors can do in the future to retain their business is the building of good public relations. We think this can best be done through employees trained in giving prompt, courteous service, supplemented with the best product that can be produced, delivered in equipment of which the employee and the company can be proud. The accomplishment of these desirable conditions will be our goal in 1949.

Columbia, Mo.—Better business in 1949 can best be brought about through better delivery service, better men, uniformed and with good looking equipment.

Oklahoma City, Okla.—It is our opinion that the ice industry should intensify its merchandising of ice and ice-using equipment to bring about more sales or better business during 1949.

Klamath Falls, Ore.—We are finding a new field in icing trucks which haul produce and fruit up and down the coast. This field might prove attractive. We feel that our big drop in ice sales is due to the decline in train movements of perishables this last summer.

Danville, Va.—As to best suggestions for the industry for 1949, we feel creditable equipment one of the best advertisements and along with this service, they build more good will, we think, than almost anything that can be done.

Tacoma, Wash.—The ice industry, as I see it, must realize as all industry must realize, that the war is over; a buyer's market is returning more rapidly perhaps than we expected and we must be prepared to face a tougher market in 1949.

New Newspaper Advertising for Special Events

A SERIES of six newspaper mats for advertising "party ice," tied in with special events and days of celebration and designed to sell all ice products, services and appliances has been issued by the Public Relations Department of the National Association of Ice Industries.

The special events with which they deal are New Year's Day, June weddings, parties, buying a new refrigerator, entertaining the boys and having guests for dinner. They are one-column wide on 12 inches and are illustrated with clever drawings.

Ice Crushers on Trucks Banned

ICE crushing machines on the back of ice delivery trucks will be banned in Dallas, Tex., according to City Health Director, J. W. Bass. Dr. Bass said that crushing ice on the street can lead to contamination by dust and dirt and is a definite health hazard. He was not sure how he would proceed to enforce his decision but he thought that present city ordinances on food contamination would cover the situation. If not, he said, he would ask the city council to pass a new ordinance.

National Ice Marketing Institute Graduates Second Class

THE SECOND class of the National Ice Marketing Institute proved that 13 is a lucky number. Because of illness, three of the original sixteen enrollments were changed to a later date, leaving thirteen men actually attending the class of October 25. There were no accidents, illness, or even failures in the group of thirteen, but there was plenty of fun derived from the number. In fact, the class set out to beat the average grade of the Charter Class and succeeded by a margin of one per cent.

Bob Walton, Field Secretary of the Indiana Association, had the honor of being the thirteenth man. Hank Shimpach, newly appointed manager of the Southwest Ice and Dairy Products plant at Altus, Oklahoma, became the thirteenth man in reverse by taking the honors for the highest grade in the class.

The second graduating class has dinner at Ciro's. Seated, J. C. Ruppert, supt., National Ice Marketing Institute; Robert W. Walton, field secretary Indiana Assn. of Ice Industries; Daniel A. Prager, director, Personnel Training and Marketing Dept.; Howard Campbell, The Southland Corp., Dallas, Tex.; Cooper H. Andres, Southwest Ice & Dairy Products Co., Oklahoma City, Okla.; James W. Gilliam, Beare Ice & Coal Co., Jackson, Tenn.; George W. Crane, Birmingham Ice & Cold Storage Co., Birmingham, Ala.

Standing.—H. Hammond Snyder, Mutual Ice Co., Alexandria, Va.; A. J. Porch, Texas Ice & Fuel Co., Houston, Tex.; Henry J. Shimpach, Southwest Ice & Dairy Products Co., Altus, Okla.; James D. Harris, Morris Ice Co., Jackson, Miss.; Carl N. Summers, Electric Ice & Fuel Co., Charlotte, N. C.; Harry C. Conklin, Jr., Southern Ice Co., Charleston, S. C.; Frank Alderdice, Southland orp., Dallas, Tex.; Joe Brady Nelson, Beare Ice & Coal Co., Humboldt, Tenn.

However, the group did not feel that the question of the "Thirteenth Man" was satisfactorily settled. So, Class President Howard Campbell, Division Manager for the Southland Corp., Dallas, Texas, ordered an election to be held after the graduation dinner at Ciro's. James "Jobie" Harris, sales manager for Morris Ice. Co., Jackson, Miss., was unanimously elected to this lucky position. Mike Conlin, Route Supervisor, Southern Ice Co., Charleston, S. C., expressed the sentiment of the group with these words: "Thanks to the 'Thirteenth Man,' whoever he is, for he has given us thirteen times as many ideas instead of only twelve."

Frank Alderdice, division manager, Southland Corporation, as master of ceremonies for the graduation dinner, entertained the group with introductory remarks about each man before asking him to talk. Daniel A. Prager, Director of the Personnel Training and Marketing Department for the National Association of Ice Industries, presented diplomas to the class.

All of the thirteen members, with a total of over 150 years of experience in the Ice Industry, expressed their high appreciation of the Institute Course.

Reports From Unit Ice Associations

Kentucky Ice Manufacturers Association, Annual Convention

THE 34th annual convention of the Kentuckly Ice Manufacturers Association was held in the Seelbach Hotel, Louisville, Ky., Monday and Tuesday, November 22 and 23. Although the attendance was below normal the program was excellent. The banquet and floor show were very entertaining and the testimonial luncheon honoring W. Scott Glore was a most delightful event.

Monday morning was devoted entirely to registration and inspection of exhibits. At 1:30 p.m. President Williamson called the convention to order and after an address of welcome Secretary King reported that the association was in an excellent financial condition and that the membership was practically the same as it was in 1947.

The first speaker on the afternoon program was E. S. Woosley, vice-president, Louisville Trust Co. whose subject was, "What the future holds for us." Mr. Woosley lauded the ice industry for the way it has held it own against mechanical competition. He said that any industry capable of holding a place among the first ten largest industries must be a well managed industry and that the banking industry was more than interested in such accounts.

Henry L. Dithmer, Jr., of the Polar Ice & Fuel Co., Indianapolis, Ind. spoke on the subject of "Cutting Corners." Mr. Dithmer told of the progress his company had made in perfecting "one man" ice plant operations and invited everyone present to visit his company's new one man plant at New Albany, Ind. at the close of the convention.

Ice Advertising

Guy W. Jacobs, director of the Public Relations Department, National Association of Ice Industries spoke on the subject of "Telling the World About Ice." Mr. Jacobs gave a detailed account of the proposed ice advertising program for 1949 and announced that the "Big Nine" had renewed their agreement to match dollar for dollar every dollar subscribed by the rest of the ice plants in the U.S.A. Mr. Jacobs said that the 1949 advertising would be spread over a large number of national magazines and more people would be reached as a result.

Edward G. Vail, secretary, National Association of Refrigeration Manufacturers discussed the refrigerator situation for 1949. He said more refrigerators will be available in 1949 than in any previous year since 1943, but unless the icemen of the country order well in advance, the manufacturers will not make them in any great quantity since they have no place to store them. He issued a stern warning that if they expected to continue in the ice business they had better buy refrigerators now and start selling them to their customers before they buy mechanicals.

Monday evening a delightful steak dinner was served while the Starlight Trio played dance music. At the conclusion of the dinner the entertainment part of the banquet was turned over to the master of ceremonies. Seven varied acts were introduced in succession by the MC not including a surprise act which was turned in by the ice men from Paducah.

Tuesday morning W. D. Ramsey, district manager, Shell Oil Co. spoke on the subject, "We sell service." Mr. Ramsey told how the Shell Oil Co. trains their men to give courteous service to customers because good service brings them back for more gas and oil. The ice business is very much like the oil business, he continued, in that they both require service and the company that give the best service is the one that gets the business. A company is judged by the men that serve the customers so it is vitally important that every care should be given by the company in its selection of personnel.

1948-49 Officers Kentucky Ice Manufacturers Association

President, Tom Smith, Louisville, Ky.
Vice-president, Robert W. Snow, Fulton, Ky.
Treasurer, F. J. Sutterlin, Frankfort, Ky.
Secretary, R. T. King, Louisville, Ky.

C. P. Austin, director NAII Research and Engineering Department, spoke on "New Frontiers" dealing with new uses for ice and how to go about cashing in on some of this new business. Thousands of tons of ice in crushed form are being sold by many ice plants to vegetable farmers, truckers, wholesalers and retailers, he said. It is a year round business if sold properly.

Iced Vegetables

Mrs. Walter Clemmons, graduate, University of Kentucky Experimental Department gave a detailed report on the progress the University was making with iced vegetables and fruits. Mrs. Clemmons said that her demonstrations in Lexington grocery stores were very successful so far as the buying housewife was concerned and that vegetable display cases should be placed in every grocery and vegetable market in the state.

A colored talking picture, "Water, Water, Everywhere," dealing with the purification of water for every use including ice making, was shown by the American Cyanamid Co.

Testimonial Luncheon

Tuesday noon a testimonial luncheon was given in honor of W. Scott Glore the association's first president. David J. Copeland made the testimonial address and gave a complete history of Mr. Glore from the time he was born in Louisville until the present. Although past 70, Mr. Glore is still head of a thriving business which deals in ice, coal, gas and oil and bottled beverages and just recently purchased the materials for an entirely new ice plant as well as new machinery for the bottling plant. Special guests at the luncheon were past presidents of the association.

At the close of the convention, twenty-five members of the Association and guests were taken to the one man ice plant of the Polar Ice & Fuel Co. at New Albany, Ind. where they were guests of H. L. Dithmer, Jr.

Resolutions

Resolutions were passed by the convention calling attention to the York Company's advertising in connection with its merchandising of an ice cube machine and requesting that the statement that it will make ice cubes for as little as 15 cents per 100 lbs. be discontinued.

Delta States Ice Association Annual Convention

THE Delta States Ice Association held its annual convention at the Roosevelt Hotel, New Orleans, December 13 to 15, with an attendance of over 350. New Orleans being one of the outstanding convention cities in the United States, more ladies were attracted to this meeting than ever before.

Pre-convention activities started Sunday with a Board of Directors meeting and committee meetings in the afternoon. In the evening, President J. R. Gaugler's party for officers, directors, past presidents and their wives was a gala event.

On Monday more than 100 ladies were guests of the Association at a typical New Orleans luncheon in the Crystal Room of "La Louisiane," one of the famous restaurants in the French Quarter. Mrs. J. R. Gaugler, assisted by the ladies of her Entertainment Committee were hostesses long to be remembered. Tuesday they were again luncheon guests, of Sam Bonart Uniforms, Inc., of New Orleans. Mrs. Jules J. Paglin and Mrs. Dan Kahn were hostesses at this event.

Tuesday evening, December 11, the Grand Ball Room at the Roosevelt was crowded with convention delegates. The annual banquet, floor show and dance got into full swing at 7:15 p.m. The association was honored by the presence of Mr. and Mrs. George Steers, Mr. and Mrs. Mount Taylor and Guy Jacobs, all from the National Association.

The Convention Program

The convention program was divided into one session of three hours for each of the three days. This arrangement guaranteed practically a full attendance and close attention at each session. Also it left ample time for delegates to visit the many exhibits in addition to renewing friendships.

The first session was opened by President J. R. Gaugler and after the address of welcome and treasurer's report, Secretary Bob Milling outlined the work and accomplishments in 1948. In particular, he reported that the vegetable icing program appeared to have gained a strong hold in many locations of the three states, and 1949 should go far in establishing this lucrative business in all the major markets.

President Gaugler spoke in detail on the program of association work during 1948 and outlined a very comprehensive program of future activities. This program covers all phases of work that should be planned for and carried out during 1949. Mr. Gaugler further stated that it is his opinion that if such a program is carefully followed, it will lead the association to greater and greater accomplishments.

Col. A. B. Hay, public relations director of Southern Bell Telephone & Telegraph Co., New Orleans, talking on public relations, said that the practical approach to good public relations is to have every employee believing in the company, the product it makes, and practicing the "good neighbor" policy toward all with whom they come in contact. To function properly, he said, there are three fundamentals: the proper attitude of the company toward is employees; the proper attitude of the employees toward the company; and the proper attitude of all toward their customers.

Guy W. Jacobs, director of the Public Relations Department, National Association of Ice Industries, presented a very impressive outline of the accomplishments of that department. Campaign results have been most encouraging, he said, and now that this movement is gaining in momentum, more and more individual ice manufacturers are flocking to the public relations program with subscriptions and words of praise. An impressive portion of Mr. Jacob's presentation was by means of visomatic pictures showing the methods of overcoming any arguments or resistance that might be encountered in enlisting the support of members of the ice industry in this important program.

One of the highlights of the program was a panel presentation of the application of a safety program, led by L. Scott Hudson and John F. Truxville, safety engineers of Fort Worth, Texas. This panel was composed of S. P. Gates, Garland L. Bonin, Emmic LeBlanc, Luke LeGendre, Coley Prudhomme, Adam Jannise, and M. H. Roach of Gulf Public Service, Inc. Various accidents were discussed and analyzed as to mechanical failure, errors in judgment or carelessness. All phases of ice plant injuries were discussed as to cost in man hours, medical, the insurance companies involved and the ice company. Preventive methods were gone into on all types of injuries and demonstrations made as to proper methods of raising and lowering blocks of ice.

Second Session

First vice-president Joe Henry Morris of Jackson, Miss., directed the second session.

Dr. H. L. McCracken, of Louisiana State University, speaking on inflation, criticized government economists for trying to maintain an artificial balance between supply and demand. He stated that a very large percentage of the population is composed of middle class workers whose incomes have not kept pace with inflated prices. Under the farmer subsidy system the farmers were encouraged to plant enormous crops and create large surpluses of staple foods which should have caused them to drop in prices, but the cost of maintaining this artificial condition not only discriminates against the great middle class, but adds tremendously to the tax burden.

Mount Taylor, executive secretary of the National Association of Ice Industries rendered a report on business conditions as related in the ice industry in the United States during 1948. He stated that for two years the industry had lost tonnage, the year 1948 showing a drop of 12.1 per cent the nation over. This drop was partially due to adverse weather conditions, and another factor was a general tightening up of the free spending extant during the past few years. In charting the course for 1949, Mr. Taylor said, members of the industry must remain alert and develop new ideas, new methods, new techniques and renew their confidence in the future of ice.

John H. O'Neill, of the Louisiana State Board of Health New Orleans, discussed the relation of ice and health. Ice, he said is no longer a luxury, but an essential food item. The manufacturing, processing and delivering of ice should be done so as to allow no possible chance of contamination. Such precautions cost very little and in reality are but good housekeeping principles applied to industry.

Processed Ice

"Vegetable icing and Processed Ice," was a panel discussion led by Alex S. Hill Jr., of North Little Rock, Ark. Included in this panel were Lee Guiterrez, Biloxi, Miss., R. H. McKay, Little Rock, Ark., Clifton Baillio, Alexandria, La., Jobie Harris, Jackson, Miss., Herbert Mayberry, Jitney Jungle Store, Jackson, Miss., and Eugene Mahan, Texarkana, Ark. Many phases of aggressive merchandising were discussed by this panel and it was one of the important parts of the program.

The last session was conducted by second vice-president R. H. Hunter of Paragould, Ark.

Charles F. Hood, Independence Ice & Creamery Co., Independence, Mo., in a talk on processed ice said that

realizing its possibilities, he had organized a merchandising council among his neighboring ice distributors to push its sales. In view of the fact that the ice industry has now licked its production problems and must therefore tackle the job of merchandising, Mr. Hood said he believed the organization and functioning of a merchandising council is the answer.

The selection and training of personnel by H. D. Monroe, Esso Standard Oil Co., New Orleans, was an interesting contribution. He said that the man selected must have qualifications that will fit him to perform his duties; he must be trained to perform his assigned duties in an acceptable manner so as to reflect credit on his company; and there must be perfect understanding between management and labor, which is necessary to weld them into a perfect team.

The convention was brought to an interesting close by Billy Beard of Atlanta, well known local humorist. His discourse on "A Cross Section of Observations," was both enjoyable and exhilirating.

Officers and Directors

The following officers and directors were elected:

President, Joe Henry Morris, Jackson, Miss.
Vice-president, R. H. Hunter, Paragould, Ark.
Vice-president, C. C. Tebbetts, New Iberia, La.
Treasurer, E. L. Wise, Warren, Ark.
Secretary, R. N. Milling, Monroe, La.

Directors at Large: W. J. Ayers, Memphis, Tenn.; R. A. Jones, Hot Springs, Ark.; S. H. Henderson, Ferriday, La.; M. M. Lanius, Baton Rouge, La.; Lee Gutiereez, Biloxi, Miss.; J. E. Todd, Grenada, Miss.

Regional Directors, Louisana: J. H. Harris, Alexandria; W. S. Moss, Shreveport; E. L. Folse, Thibodaux; W. J. Sanches, Baton Rouge; Geo. Spainhower, Shreveport; Andrew L. Yerger, Tallulah.

Regional Directors, Arkansas: S. H. Atkinson, Texarkana; Alden Baker, Harrisburg; J. W. Dawley, Dallas, Tex.; Alex S. Hill, N. Little Rock; B. C. Huddleston, Searcy; H. R. Ritter, Marked Tree.

Regional Directors, Mississippi: Lem S. Pittman, Columbia; J. L. Blackwell, Okolona; J. B. Johnston, Eupora; J. C. Phillips, Hattiesburg; J. D. Pigott, McComb; J. E. Allen, Winona.

Southwestern Ice Manufacturers Hold Annual Convention

WAYS and means of improving conditions facing the ice industry were discussed by speakers at the three-day annual convention of the Southwestern Ice Manufacturers' Association held at El Paso, Tex., December 7 and 8.

Tom E. Rogers of El Paso, general manager of the Consumers Ice and Fuel Co., was elected association president for the coming year, succeeding Clarence E. Leon of Rotan who became a member of the board. Other officers elected were Harry M. Park of Fort Worth, owner of the Stephenville Ice Co., vice-president; and Jacob M. Irvine of Dallas, Southern Properties, Inc., treasurer. Elected to the board of directors were Fred W. Beazley, Jr., Dallas; R. C. Rankin, Abilene; Roy A. Stamps, Gainesville; W. C. Stevens, Omaha; J. W. Sweeney, San Benito; B. S. Beaman, Houston; Howard Campbell, Dallas; Ralph H. Irvine, Palestine; E. E. Irwin, Columbus; and Elmo McGree, San Antonio.

Approximately 400 members and guests attended the convention. Robert J. Bailey of San Francisco, president of the Union Ice Co., delivered the main address, stating that encouragement, training, and rewarding of employes will benefit the ice industry more than any other program. He pointed to his own company where top executives are all long-time employes who started at the bottom.

South Carolina Ice Manufacturers Association Annual Convention

A VERY successful annual meeting of the South Carolina Ice Manufacturers Association was held at the Columbia Hotel, Columbia, S. C. Registration started about noon Monday and a luncheon was held for the ladies at 1:30 p.m.

Opening the first session, W. S. Reamer, president-elect of the Columbia Chamber of Commerce welcomed the ice folks to Columbia. McQueen Quattlebaum gave his president's report after which the different reports from committees were heard, "Road Signs," a report from Mount Taylor, National Secretary, was read by Fritz Cappell and proved to be very interesting and informative.

Monday afternoon a Christmas party was given for the ladies by the James L. Tapp Company at their beautiful store on Main Street. All those who attended said it was very delightful.

Dan Prager from the National Association gave a short talk and showed a film, "Telling the World About Ice," after which Sgt. Billy Fallaw from the South Carolina Highway Department talked about "Truck Fleet Operation" and "Safety" and showed an interesting motion picture, "Traffic with the Devil."

The annual banquet Monday evening was a delightful affair with Senator James H. Hammond outdoing himself in a speech which warned the ice industry to "wake up to the challenge of competition or dry up and go out of business." The speceh of Senator Hamomnd probably was the highlight of the convention; it was very humorous and at the same time gave members of the audience something to think about. Before and during the banquet, music was furnished by the Allan Taylor Trio. Immediately after the banquet a real old-time square dance was enjoyed by everyone.

The second day of the convention a most interesting session was held, highlighted by talks by Dave Copeland, "Merchandising Appliances," Dan Prager on "Planned Selling Pays Off," and "Insurance Costs" by James Norment.

Officers and Directors

The newly elected officers and directors are as follows:
President, Walter Dobbins.
Vice-president, B. O. Browder.
Secretary, Geo. L. English, Columbia.
Treasurer, Henry M. DaVega, Jr. Columbia.

Directors: E. L. Lowie, J. T. Langston, R. V. Sisk, J. B. Mahoney, E. H. Moses, Jr., McQueen Quattlebaum, W. R. Crossfield; M. A. Hansen and Sara DeLoache.

A silver platter was presented to McQueen Quattlebaum for his services during the past year as president of the association.

Old Michigan Ice House Razed

AFTER being a landmark for twenty-seven years, the last natural ice house at Alpena, Mich., has been razed. This building was erected in the fall of 1921 by the late Jules Baylore whose ice wagons were a familiar sight on the streets of Alpena. The horse-drawn wagons were equipped with bells so that housewives could know when the ice man was in the neighborhood. The building was 100 x 100 ft. and had a capacity of 50,000 cakes of ice 16 x 22 in. Ice was cut from the river. It took about twenty-five days for the harvest and some forty men were employed. In 1922 the building was sold to Albert and Wm. Gohike who continued in the ice business, but in 1940 it was sold again and converted into a beer distribution plant. It had been used only as a storage building for sometime and had become a fire hazard.

New England Ice Association Annual Meeting

THE annual convention of the New England Ice Association was held at the Hotel Sheraton, Worcester, Mass., December 13 to 15.

Speakers during the convention included Daniel Prager, director of personnel of the National Association of Ice Industries, Washington; Robert Ziehm of Boston; Prof. Grant B. Snyder of the University of Massachusetts; and Robert Harper of the National Association of Ice Industries.

The convention had a round table discussion on, "The Tonnage Builder," a new ice-making apparatus for vegetable storage. Taking part were Albert Christensen, Connecticut commissioner of markets, Andrew Andrich of the National Association and Professor Snyder.

Donald Rose, sales manager of the Big Ten Co., of Louisville, Ky. spoke on, "Sale of Commercial and Domestic Refrigerators."

Taking part in a panel discussion on new uses of ice were Mr. Larsen, Mr. Getchell and Charles Dearing of Somerville, Mass. A discussion on show rooms was conducted by Sidney Harris of Leominster, Mass.; Watson Clark of Rumford, Me.; George Breen of Providence and Charles Ross of Pawtucket, R. I.

Before concluding the proceedings these directors were chosen to serve with the regional vice presidents, each to serve three years: Karl W. Penney, vice president of the Tatnuck Ice Co., Worcester, Mass.; Walter Chafee of Providence; L. T. Wood of Manchester, Conn.; Donald Elliott of Georgetown, Mass.

Albert P. Westcott of Worcester, Mass., was registration chairman. Assisting in the arrangements for the convention were Mr. and Mrs. Cyril Penney, Mr. and Mrs. Karl W. Penney, Mr. and Mrs. Morris Torpey and Mr. and Mrs. Harold Hadley, all of Worcester, Mass. The annual banquet was held Tuesday evening.

Officers and Directors

The following officers, regional vice-presidents and directors were elected for the coming year:

President, Carroll C. Thatcher, Attleboro, Mass.

Regional vice-presidents, Samuel Stevens, Torrington, Conn.; Ralth Getchell, Jr., Bangor, Me.; Peter F. Hogan, Springfield, Mass.; Louis Richer, Manchester, N. H.; Norman J. Vermette, Bristol, R. I.; and Leon F. Whitney, Brattleboro, Vt.

Secretary, Charles W. Larsen, Somerville, Mass.

Treasurer, Adam J. Sangster, Leominster, Mass.

Executive Director, R. T. Wilbur, Boston, Mass.

Directors: Karl W. Penney, Worcester, Mass.; Walter Chafee, Providence, R. I.; L. T. Wood, Manchester, Conn.; Donald Elliott, Georgetown, Mass.

Illinois Association of Ice Industries

By WM. D. WRIGHT, Secretary

THE 42nd annual convention of the Illinois Association of Ice Industries will be held at the St. Nicholas Hotel, Springfield, Ill., January 20 and 21. At 6:30 p.m. Wednesday, January 19, there will be a get-acquainted, party which will include a buffet luncheon, entertainment, and liquid refreshments. This affair was very popular last year and did much to bring the members closer together.

The convention proper will open Thursday morning, January 20 and will continue until adjournment Friday afternoon, January 21. All the usual exhibitors will be there and some new ones, all showing the latest developments in their respective lines for inspection and approval.

The first session Thursday morning, January 20, will be built around management problems. The session Thursday afternoon will be in charge of the Merchandising Council and will be devoted entirely to the subject of merchandising and its allied angles and the Friday morning session will be in charge of the Engienering committee, which will handle all the problems of manufacturing.

The annual party will be held as usual Thursday evening, January 20, and the committee is now in the process of obtaining talent for the entertainment.

Canadian Association of Ice Industries

By K. C. MCCREA, Secretary

QUANTITY supply of ice refrigerators in Canada does not appear to be a problem any more but quality supply is causing Association officers and members some concern. There is a strong feeling that the Canadian Ice Refrigerator manufacturers are not keeping the design of their units on a comparable basis with mechanical refrigerator design. We received some good news along this line however recently when one of the large refrigerator manufacturers annuonced discontinuance of further production until they were tooled up for production of their new style refrigerators.

Almost since Canadian ice companies started to merchandise ice refrigerators there have been a number of members who have not undertaken this important ice sale promotion work because they did not have the foresight to order refrigerators for delivery previous to warm weather demands: lacked financial resources to buy ahead of time or many other reasons. To correct this situation the Association has decided to purchase and warehouse a number of refrigerators this winter for sale to members next spring at factory cost plus handling charge. This is a brand new venture which will be watched closely by Directors for defects and advantages. It may well contribute greatly to increased ice refrigerator sales.

W. J. T. Morrow, president of the Assaciation has issued a cordial invitation to all ice men to attend Canadian ice convention to be held at the Vancouver Hotel, Vancouver B. C., March 10 and 11. He hopes members and their wives will make a real effort to be there and that they will extend their visit beyond the two-day convention.

Missouri Ice Manufacturers Association

By V. A. ESPHORST, Secy.-Treas.

THE 24th annual convention of the Missouri Ice Manufacturers Association will be held in Kansas City, Mo., February 2-3-4, 1949, at the Hotel President. The program has not yet been completed, but some of the speakers already scheduled are: Robert L. Burnes, sports editor of the St. Louis Star-Times; John Glenn, Glenn Ice & Fuel Co., Beardstown, Ill.; H. H. Mobley, Director of the Resources and Development Department of Missouri; Richard C. Muckerman, executive vice-president, The City Ice & Fuel Co., St. Louis; and Guy Jacobs and Daniel A. Prager from the National Association office.

The Missouri Ice Merchandising Council will conduct a meeting as part of the convention program. This will give those present an opportunity to exchange merchandising ideas. Responses from Associate Members indicate an outstanding display of equipment.

In addition to the well-rounded business sessions, outstanding entertainment will also be one of the features of the convention. A luncheon and the annual banquet, floor show and dance will be held Thursday, February 3. Displays will be in the Junior Ballroom on the 12th floor. All meeting sessions will be in the Large Ballroom, also on the 12th floor. The registration desk will be on the 12th floor lobby and will be open at 9:30 a.m., February 2.

The Practical Refrigerating Engineer

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Good Practice In Condenser Operation

By Leon Buehler*

THE condenser is an old piece of equipment and the principles on which this talk is based were true for the first condenser ever built although they may not have been so well understood at that time. Through the years a wide variety of condenser designs were tried but most of them were abandoned for one reason or another so that today we find only a few simple types.

Condenser Types

1. The multipass shell and tube with the condensing refrigerant in the shell surrounding the tubes has the water flowing through the tubes. Water heads, which may be removed to permit cleaning the tubes or replacement of tubes, are attached to the tube sheets and direct the flow of water back and forth through a number of tube circuits or passes, there being one or more tubes to each pass. By properly proportioning the tube size, condenser length, number of passes and tubes per pass, it is possible to attain the highest water velocity with the water pressure available or with a practical pumping head when the desirable quantity of cooling water is circulated and to thus attain a high rate of heat transfer and good performance with a moderate amount of cooling surface. This type of condenser has a low first cost.

Particularly for use with the Freon refrigerants, the tubes are frequently finned on the outside, that is, the refrigerant side, which reduces the total feet of tube required and permits shorter water passes and higher water velocities without excessive pressure drop, thus resulting in very high performance values. This condenser can be operated under pressure on the water side which may be of advantage for example when used in conjunction with a cooling tower.

2. The vertical shell and tube condenser also has the refrigerant in the shell surrounding the tubes and is provided with water distributors to direct the water against the inner tube walls at the top in a film which trickles down the tube. One advantage of this design is that the tubes can be brushed out or otherwise cleaned during operation as there are no water heads to be removed. The condenser depends upon gravity flow of the water which drops into an open pit and it can therefore not be operated under pressure on the water side.

3. The evaporative condenser is an induced draught cooling tower with the condensing surface in the form of coil bundles disposed inside the tower. The coils take the place of the usual fill of the tower and the circulated water should wet all of the condensing surface. The heat dissapated from the condenser goes principally into evaporating a portion of the circulated water with only a small portion raising the sensible heat of the circulated air.

4. The air cooled condenser consists of a coil (usually finned on the air side) with the condensing refrigerant inside the coil and cooling air blown over the outside. All of the heat is absorbed by the air—no water is used. This condenser is employed only in small capacities; rarely on over 2 h.p. machines. Its advantages lie in that no water connections are required that danger of freezing is avoided; that corrosion is not ordinarily encountered and that sealing is avoided although the air side may need occasionally to be cleaned of dust or oil deposits. Its disadvantages are that more condenser surface is needed, that in warm weather it is not possible to attain as low condensing pressure as with water cooled units and that considerable power is needed to drive the fan. In spite of its poor efficiency, the simplicity and foolproof nature of the air cooled condenser make it the logical choice for household refrigerators, store fixtures, farm coolers, refrigerated trucks and the like.

Liquid Lines and Connections

The connections to all of the above types of modern condensers are very simple. The discharge is brought into the top and the liquid line out of the bottom. The flow of liquid from the condenser to the receiver is entirely by gravity. If there is a high concentration of noncondensible in the receiver, which can readily occur, so that the condensing temperature of the refrigerant is below the ambient or if the receiver is in a room considerably warmer than the cooling water there will be reevaporation of refrigerant and this vapor must return to the condenser through the liquid line in the direction opposite to the flow of liquid. The liquid line should therefore be direct with a minimum of horizontal run (and then pitched to the receiver) and should be of liberal size. The ACRMA standard for ammonia gives the following capacities for the liquid line between the condenser and receiver: 1 in.—24 tons, 1¼ in. —50 tons, 1½ in.—77 tons, 2 in.—140 tons, 2½ in.—220 tons,

Presented at the 39 National Convention, NAPRE.
* Chief Refrigerating Engineer, The Creamery Package Mfg. Co., Chicago.

3 in.—375 tons, 3½ in.—540 tons, 4 in.—740 tons. For Freon 12 the capacity of the line is about 22½ per cent of that listed for ammonia.

If the liquid line is too small, the receiver may become gas bound—the liquid will not drain down from the condenser. This condition may be corrected by installing an equalizing line from the top of the receiver to the top of the condenser to provide a separate path for the flow of vapor from the receiver to the condenser. A word of caution is in order. If the condenser is in the form of a long coil with high gas elacity, there will be (particularly with Freon 12) a considerable pressure drop and in that case, the equalizing connection will not help the situation.

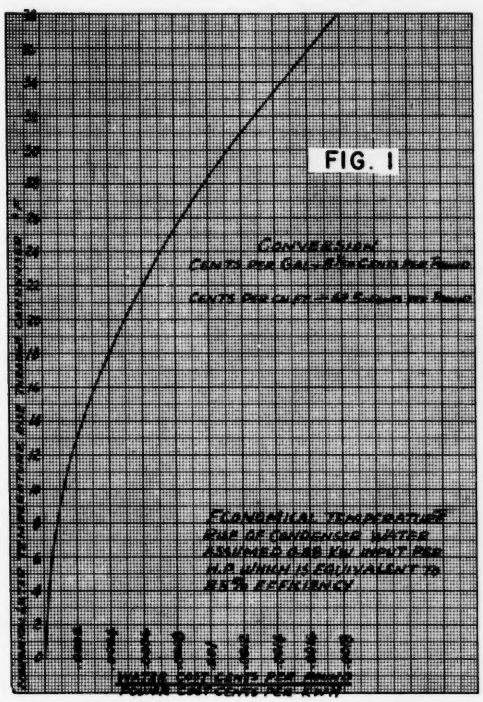


Fig. 1—Selection of economical water temperature rise through the condenser on the basis of various water costs and power costs.

Water Quantity

One of the first questions that would occur to any operator is "How much cooling water should be circulated?" You know, of course, that the more water you use, and the colder your water supply is, the lower will be the condensing pressure, and, the less power will be required to drive the compressor; but water costs money, so we don't want to waste it. The water quantity should be regulated in accordance with the temperature rise of the water through the condenser as is given on Fig. 1. You will note that for a given ratio of water cost in cents per pound of water to power cost in cents per kwh, there is a certain most economical temperature rise of the water, as given by the curves.

It may be that if your water is both expensive and rather warm, that this most economical temperature rise will give you too high a discharge pressure, let's say—well over 200 pounds, and in that case, of course, you will have to use more water in order to bring the pressure within safe limits. If you have a cooling tower, you will probably want to circulate around 5 gallons per ton unless your load factor is very low, and the investment in such a large tower cannot be justified. It may be of course that your existing condensers won't handle the desirable quantity of water because it's more water than you can push through them, or, it is so little water that you don't get enough velocity to give you a reasonable heat transfer. Such a condition will of course call for a compromise, but, whenever you are ready to install new condensers, the proper water quantity should be taken account of in their design.

Clean Surface

You, of course, know only too well that when your condensing surface gets coated with scale or mud, that the discharge pressure goes up. Fig. 2 simply confirms this. It gives some heat transfer curves against water velocity through 2 in. tubes in a shell and tube condenser. I want you to particularly notice that for the high water velocities, where of course you have the best heat transfer, a certain amount of scale lowers the heat transfer rate much more than at the lower water velocity where you have figured more surface to begin with. Incidentally, I could have drawn a lot more curves and curves that would give still lower heat transfers. It just depends upon how much scale is allowed to build up before the condenser is cleaned. If the water is at all scale forming, our curves for clean tubes will apply for only a very few hours.

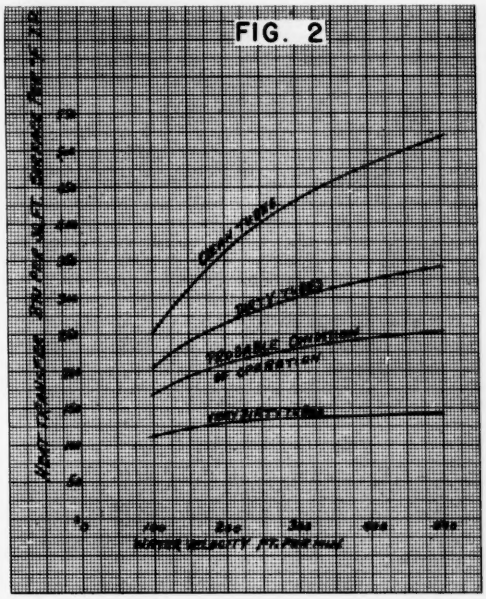


Fig. 2—The effect of scale and dirt on condenser tubes in lowering the heat conductivity of the tubes.

Fig. 3 shows much the same story in a little different way. I have here plotted three curves; each figured on three gpm of 70 degree water per ton with a velocity of 300 feet per minute through the tubes. You will note that a given amount of scale raises the head pressure much more when you only have three square feet of surface per ton

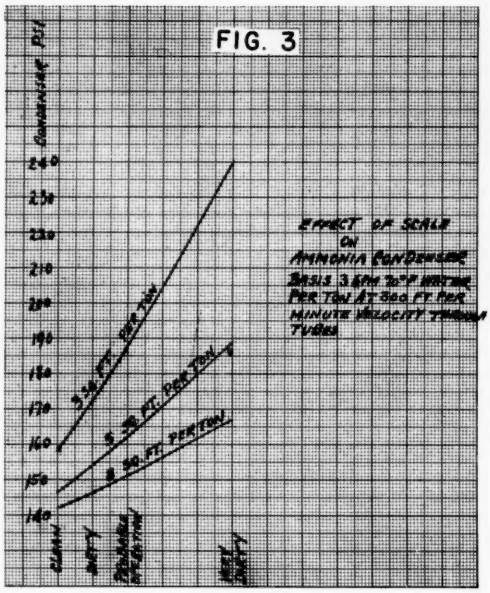


Fig. 3—Effect of scale and dirt on condenser tubes in raising the condensing pressure. Results are modified by the amount of surface per ton.

than if you have five or eight square feet. The lesson should be obvious. If you have scale forming water, use a liberal amount of condenser surface unless you are prepared to clean your condensers very frequently. Under those conditions, a skimpy condenser which can only do a job with very clean tubes, becomes an expensive piece of apparatus to keep in good working condition.

Water softening is impractical when the water is used just once and then is wasted on account of the large volume of water involved. When cooling towers, spray ponds or evaporative condensers are used, such treatment does become practical. Wasting some water from the tower in order to prevent the building up of hardness due to the continual water evaporation will greatly help to reduce scale deposition.

Scale is removed mechanically by brushing, chipping, reaming, etc. or chemically by circulation of solutions of inhibited acids which strongly attack the scale but only mildly attack the condenser metal.

Non-Condensable Gases

You all know that the presence of non-condensable gases raise the condensing pressure. There are two reasons for this and, because there is a great deal of misunderstanding in the matter, I am going to give you a complete explanation.

When several gases occupy a space in common, each behaves as though the others were absent, and the pressure upon the walls enclosing the space or at any point within the space, will be the sum of the pressures exerted by all of the constituents of the mixture. The pressure on the walls of the vessels, or the pressure that would be read on a gauge is called the total pressure, and the pressures due to each of the constituents are their partial pressure. Just one word of caution, in adding up the partial pressures they must be expressed as "absolute pressure."

The idea of several different gases all in one vessel—each at a lower pressure than the actual pressure on the walls of the vessel, may be hard to conceive. Let us, therefore, consider how a gas exerts pressure on the wall. The gas is made up of many minute particles which are traveling at high velocity in all directions. A certain number of these particles will strike a square inch of wall surface per minute. The particles will have a certain average weight and velocity. Each time a particle strikes the wall, it will require a certain force to stop it, and cause it to rebound, depending upon its weight, velocity, and the angle at which it strikes the wall. Because of the very large number of particles striking the wall, the number, weight, velocity, and angle of impact, average out, so that the sum of the forces resolves into a uniform wall pressure. With a mixture of gases, particles of each constituent strike the wall, so that each exerts its pressure and of course these pressures add up to the pressure that may be measured by a gauge.

This law is not merely a convenient method of computing the total pressure of a gas mixture. Each constituent actually exists at its partial pressure, and all of its physical properties such as density, total heat, boiling point, latent heat correspond to the partial pressure.

Fig. 4 illustrates this. The lower curves show the partial pressure of non-condensables for different concentrations of the foul gas. Now supposing we have a condenser cooled to 70 F with the compressor not running. From our ammonia tables, we can find that if we have pure ammonia in the system its pressure would be 114 pounds. That is the partial pressure of the ammonia, even when non-condensable gases are present. Now then, if we add the appropriate partial pressures of the non-condensables, we get the condenser pressure curve with the compressor shut down. You can try it in your own plant. With the very best of purging, you will probably never get down to the pressure you find in the ammonia tables.

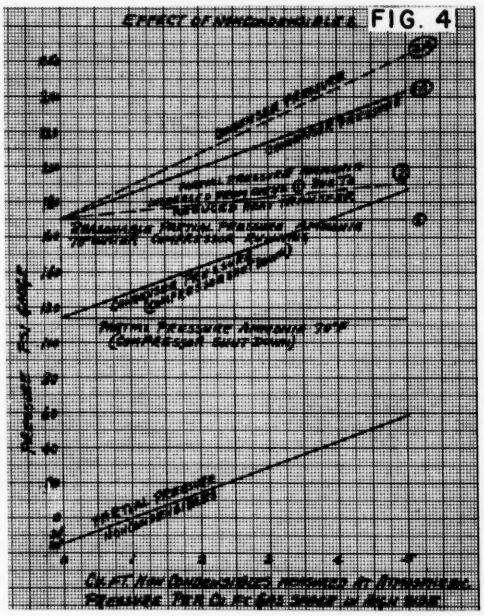
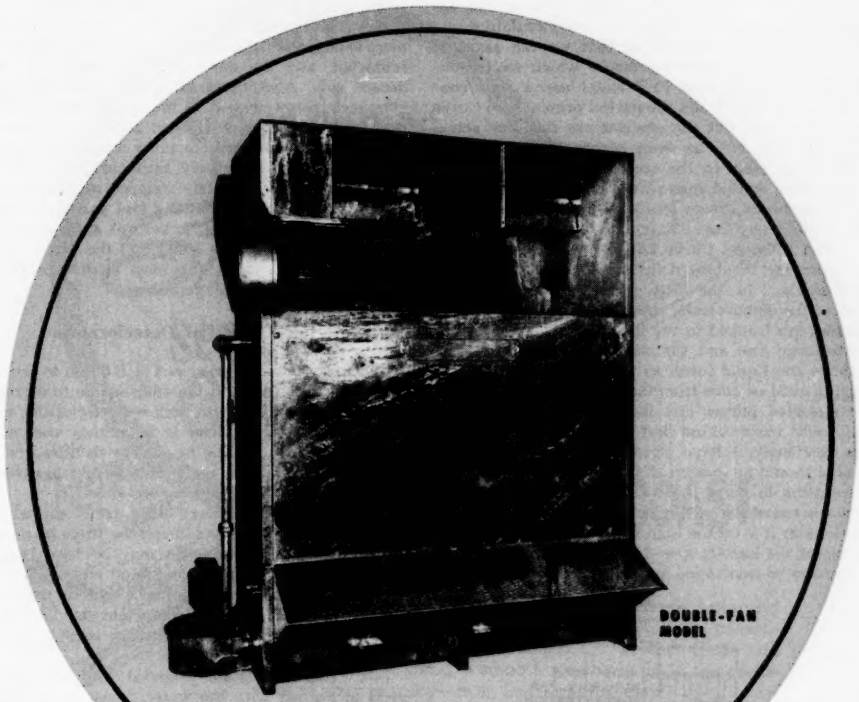


Fig. 4—How non-condensable gases increase the pressure in the condenser and on the high side of the system.

HOT-DIP GALVANIZED*



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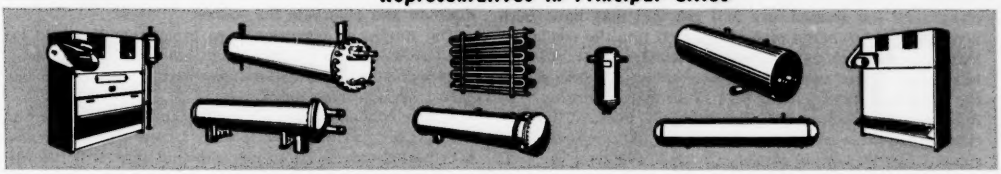

Now then, supposing we operate the compressor. If we had absolutely pure ammonia, we'd get some such line as shown by Curve 1. Exact pressure, of course, would depend upon how much 70 F water we are circulating and upon the size of the condenser so that we can say that Curve 1 is simply an assumed pressure which we reasonably can expect to get with 70 F water and a good condenser. Now then, if we add the partial pressures to Curve 1, we get Curve 1A, but the chances are that our actual condenser pressure will be even higher than this, since non-condensable gases in the condenser will also reduce the heat transfer so that instead of having a partial pressure of the ammonia shown by Curve 1, it might be some such line as shown by Curve 2, and adding the partial pressure to Curve 2, we get Curve 2A.

Let us consider the best point from which to purge a non-condensable. In the first place, especially during operation of the compressors, substantially all of the non-condensables are trapped in the high side. That is to say, in the discharge line and the condenser, and in the receiver above the liquid level, so we can immediately say that purging must be done from the high side. Where there is no refrigerated purger and then of course, purging is done only with the machine shut down and water flowing over the condenser, I have often heard it said that the purge valve should be located at the high point. Actually, if you are going to purge when the plant is shut down, it doesn't make any difference where the purge valve is located, as long as it is on the high side. The light gas won't float on top of the heavier gas—instead, it diffuses so as to give a uniform concentration throughout the vessel.

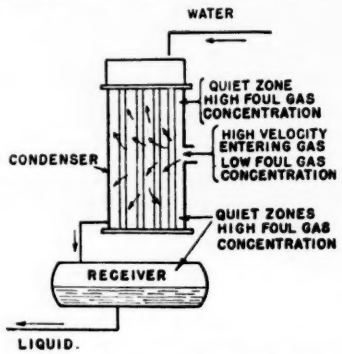

Fig. 5—Diagram of a vertical shell and tube condenser with liquid receiver and connections.

In using a refrigerated purger, the non-condensables are removed while the plant is in operation and we then have a somewhat different condition. In Fig. 5 we see a vertical shell and tube condenser and the receiver. The gas entering the condenser will be practically pure ammonia that has been just pumped from the evaporator. Excepting for traces of foul gas that will have just leaked into the low side, there can't be any foul gas in this discharge stream because the high velocity of the discharged gas from the compressor has pushed any foul gas that may have been laying in the discharge pipe ahead of it into the condenser long ago. Now, as the gas enters the condenser, it will tend to push gas already in the condenser ahead of it, and where the entering stream of gas first hits cold condensing surface, it will therefore, still be relatively pure. This first condensing surface will liquify some of the ammonia and remove it from the gas stream, in effect, reducing the concentration of ammonia vapor. As the entering gas stream progresses further, and spreads out through the condenser, it becomes mixed with the gas already present and this latter gas will have some non-condensables.

Now the further we get away from our gas inlet, the more cold condensing surface will the entering stream have contacted, and the more ammonia will have been condensed out. Also, the greater will have been the mixing of gases already present in the condenser. We can therefore say that at the point most remote from the gas inlet, particularly in such remote zones where there is relatively quiet, that is, there is very little turbulence, the gas will have been most completely stripped of ammonia and that is the same as saying that the foul gas concentration will be the highest. On Fig. 5, several such quiet zones are indicated, and it will be noted that the top of the receiver is such a quiet zone. The most advantageous points of purging is at these quiet zones.

Factors In Deterioration

Condensers usually wear out or fail due to erosion of the tubes and tube sheets at the ends or due to corrosion. The first condition occurs with high water velocities so that one solution to the difficulties is to employ condensers with lower velocities. Plastic or rubber ferrules are available for insertion into tube ends. While I have no experience with their use, I suppose they are effective.

Corrosion is just one word but it can be caused by a large variety of conditions, and therefore there is no one solution. A variety of measures may be taken singly or in combination to inhibit corrosion and what will help in one case may be useless in another. Where the problem is acute, it is suggested that a competent chemist be employed to study the matter. Let us consider some of the means of attacking the problem.

1—Corrosion resistant material may be used for the parts in contact with the water. Bear in mind that with ammonia we are limited to ferrous metals or aluminum. The latter is usually not resistant to attack. We may use copper bearing steel or wrought iron. Stainless steel offers a possibility but it is expensive and has a rather poor conductivity and hence more surface is required. Stainless is not resistant to all corrosion. With Freon we can use copper and its alloys. Copper in sea water and many brackish waters is very poor. Copper nickel alloy is commonly used for this service. Non-metallic materials such as plastics, rubber, glass, etc., do not offer much promise due to generally poor conductivity, lack of strength and brittleness.

2—Protective coatings such as galvanizing, painting and the like will give varying degrees of protection depending upon the service.

3—A less resistant material may be placed in the water stream to selectively take the corrosion. For example, a zinc plate may be suspended in the water head of a condenser. This plate will in time be eaten away and must then be renewed. Like other methods, this is not a cure-all.

4—Water treatment such as with chromates, glucocides, etc. is practical only with cooling towers or evaporative condensers as where water is wasted, the treatment becomes too expensive.

5—If the corrosion is caused by stray electric currents, discover and eliminate the source.

The subject of corrosion is so broad that it would take days to adequately discuss it. Aside from lack of time, I do not possess the specialized knowledge to give you more than these few high lights.

Proper condenser operation in large measure determines the efficiency of the entire plant. I hope that my remarks may be of some value to you and that they will stimulate more thought and discussion on this important subject.

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N.A.P.R.E. Question Box

NOTE: H. G. Venemann, Chairman of the Educational Committee, has agreed to answer through this column all questions asked by members of the N.A.P.R.E. Please send your questions to him care of Purdue University, West Lafayette, Ind.

Condenser Purge Connections

Question No. 796: When the gas inlet connection is at the center of a shell-and-tube condenser, I wonder if non-condensable gases would not have a tendency to collect at both ends. With this in mind, would it not be well to have purge connections made as near as possible to both ends of the condenser?—J.P.T.

ANSWER: For vertical shell and tube condensers non-condensable gases have a tendency to collect at top and bottom on the gas inlet side of the condenser. For that reason purge connections should be located at those points. In the case of horizontal shell and tube condensers the quiet zone is apt to be at the top and at the end farthest from the gas inlet.—H.G.V.

Brine Spray Connection

Question No. 797: We have a system which is spraying sodium chloride brine at 19 F. The brine is sprayed through a Binks No. 10 spray nozzle, having a 5/16 in. orifice, and a capacity of 2.3 gpm to 10 lb. pressure. The spray nozzle is located in the center and at one end of an 8 in. x 15 ft. long cylinder, the two components forming a sort of jet. The brine nozzle discharges the brine into the opening of this cylinder causing warm air to be drawn into the inlet and finally being discharged at the other end.

What I would like to know is, how to compute the amount of air pumped per minute by this so-called jet. Also what will be the leaving air temperature if the air enters at 36 F? The brine enters the nozzle at 19 F. and after being sprayed, drops into a sump which carries the brine back to the system at 23 F.—D.L.

ANSWER:

(1) How may the amount of air circulated be computed?

(2) What will be the leaving air temperature?

Since your spray system is already in operation your quickest and most reliable way of determining the leaving air temperature is to get it with a thermometer.

The most reliable method of determining the weight of air circulated per minute is to make a heat balance between the brine and the air.

The heat absorbed by the brine per min.$=W_b\ (23-19).8$, where W_b is the lbs. of brine per minute. In your case $W_b=2.3\times8.33\times1.16=22.22$. Therefore the brine absorbs 71.1 Btu per min.

Since the heat absorbed by the brine equals the heat rejected by the air, then $W_a\ (h_1-h_2)=71.1$

W_a=lbs. of air per min.

h_1=heat content (enthalpy) of the entering air

h_2=heat content (enthalpy) of the leaving air

h_1 and h_2 may be taken from a psychrometric chart if the wet bulb and dry bulb temperature of the air at the entering and leaving points have been found by use of a sling pyschrometer.

Let us assume that the entering air has a dry bulb temperature of 36F and a wet bulb temperature of 33.8. From the latest Carrier chart, the relative humidity will be 90 per cent and the enthalpy, h_1 will be 12.5 Btu per lb. If the leaving air has a dry bulb temperature of 32F and a wet bulb temperature of 32F, it is saturated air, and its enthalpy, h_2, will be 11.75 Btu.

Substituting these two values in the equation for weight of air.

$$W_a=\frac{71.1}{(12.5-11.75)}=94.8 \text{ lbs. per min.}$$

Similarly with 31F saturated air leaving the tube, the value of W_a may be computed:

$$W_a=\frac{71.1}{12.5-11.35}=62 \text{ lbs. per min.}$$

I do not believe that I would accept as wholly reliable the manufacturer's rating table for the quantity of brine flow. It would be better to catch the overflow in a barrel and weigh it.—H.G.V.

Freon Detector in Water

Question No. 798: Is there a reagent or indicator which would show the presence of Freon in water or brines? What I have in mind is the checking of a leak in a brine cooler, water cooler, or condenser utilizing recirculated water.—J.S.S.

ANSWER: Since Freon is practically immiscible in water or brine there would be no Freon present. If any is present it would be a small fraction of one per cent. This could be detected by heating a sample in a flask and applying a halide torch to the gas which would escape at the top. A leak of Freon in water would bubble up through the water like air and escape.—H.G.V.

New Questions

Tonnage of Liquid Cooler

Question No. 799: In a two-stage refrigerating system, how is the capacity of the liquid intercooler calculated? For instance a quick freezing plant with the evaporator operated at —40 F requires 20 tons of refrigeration. A two-stage ammonia system is used and condensing pressure is 185 lbs. gage. How is the size of the liquid intercooler calculated?—W.R.K.

Conductivity of Stainless Steel

Question No. 800: Is it true that stainless steels conduct heat more slowly than ordinary steel used in making pipe? Why is this true?—L.C.M.

Odd Size Compressor

Question No. 801: Will you please advise me as to what happens to the volume, brake horsepower, cu. ft. per minute per ton, capacity and efficiency when the compressor is too large, and when the compressor is too small for the coil—C.E.W.

Member Activities

San Francisco

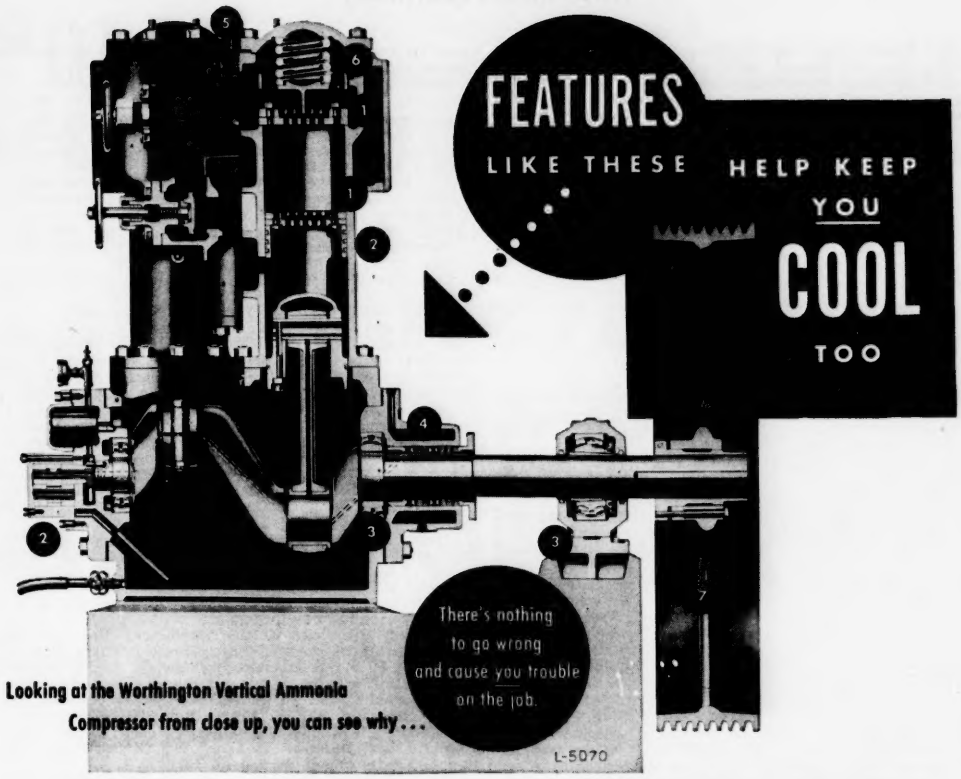
By ANDY HOPE

MANY thanks to F. Hunter McLaughlin for taking over the secretarial duties during the month of November. In fact he did such a good job that we elected him to the position of Secretary of the Chapter for 1949. Other officers elected at the meeting of December 8th were:

Prsident, Andy Hope
First vice-president, M. T. J. Garlinger
Second vice-president, Wilbur C. Roberts
Sergeant-At-Arms, Fred L. Imsand
Treasurer, Orman H. New

Reports on the New Orleans convention given by Brothers New, McKenna and Hope indicated that all aspects of the refrigeration field were well covered from an educational viewpoint and that the varied facets of the entertainment program uncovered many interesting and enjoyable moments that will be long remembered by those in attendance.

The feature of the regular meeting as presented by Wilbur Roberts was a film "Operation Cross-Roads" shown thorough the courtesy of the Photographic Division of the Sixth United States Army. It depicted the Bikini Atom Bomb Tests that were held in 1946 and gave us an idea of the tremendous amount of work involved in preparing for these tests and in providing for adequate coverage of the results by means of many cameras and instruments so that the results could be properly evaluated. The scenes of the actual over and under water explosions were awe-inspiring, to say the least.



Looking at the Worthington Vertical Ammonia Compressor from close up, you can see why . . .

The exclusive large-area Worthington Feather* Valve (1)—on both suction and discharge—is the simplest, most durable valve ever made. It consists of flexible ribbon steel strips which seat lightly on ground-face, slotted seats.

Larger sizes have full force-feed lubrication (2) of all running gear; smaller sizes have ample splash lubrication, with self-priming oil pumps and renewable-cartridge filter.

Main and outboard bearings are self-aligning, double-row roller type (3).

The shaft stuffing box (4) is water-jacketed and is extra deep to take the lantern gland and an ample number of packing rings. Oil under pressure is circulated through the gland.

The unit-type manifold (5) has improved quick-opening relief valve. Safety head (6) with ground joint reduces slop-over hazard.

The Worthington Multi-V-Drive (7) includes the easy-on, easy-off, always-tight QD Sheave.

Write us for Bulletin C-1100-B18B giving complete information. ***Worthington Pump and Machinery Corporation, Harrison, N. J. Specialists in air conditioning and refrigeration for more than 50 years.***

Part of a balanced system for greater efficiency

The *balanced design* of the Worthington Vertical Ammonia Compressor is duplicated, on a larger scale, in Worthington *systems* for refrigeration and air conditioning.

Worthington *manufactures all* the vital "innards"—compressors, condensers, engines, turbines, pumps. The result is a completely *integrated* system—for more efficient, more economical operation.

That's why *there's more worth in Worthington.* See your nearby Worthington distributor—in the Classified Telephone Book.

*Reg. U. S. Pat. Off.

WORTHINGTON

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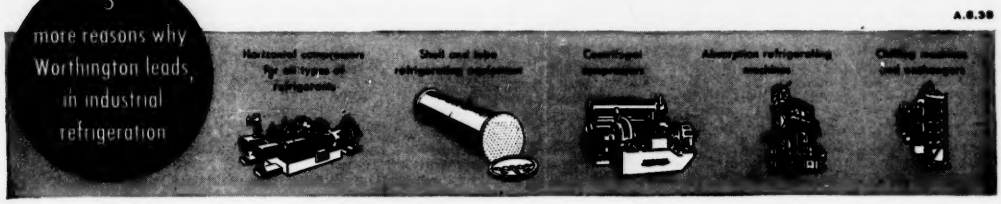
5 more reasons why Worthington leads in industrial refrigeration


Horizontal compressors for all types of refrigerants
Shell and tube refrigerating condensers
Centrifugal compressors
Absorption refrigerating machines
Chilling machines and evaporators

Mr. Roberts concluded the showing of the picture by stating that we should realize the great forces locked within the Atom Bomb and in order to insure its wise use we should avail ourselves of every opportunity to take part in Civic affairs and communicate to our Congressmen and helpful ideas that we may have on how we can preserve our country and make it a better place in which to live.

New Orleans

By FRANK GILLIO

The officers elected to serve the chapter during the coming year are:

President, E. G. Ford
First vice-president, J. R. Tennyson
Second vice-president, L. W. Howat
Third vice-president, B. J. Mancuso
Financial Secretary, B. Graff
Treasurer, G. J. Whitman
Recording Secretary, F. X. Gillio
Sergeant-at-Arms, J. Chaissen.
Board of Directors: W. J. Williams, chairman; R. Frischherta, E. W. Orth, F. J. McCarthy, W. C. Bernard Jr., B. Louviera.
Educational Chairman, L. J. Vivien.

The course on Elements of Electricity by Ben Segall of the Best Electric Co. was recently completed. This course attracted wide attention as shown by the average attendance of more than 70 members. Much valuable information about electricity was gained by these members who will be able to use it in their daily work in plant operations.

Special speakers at our meetings have presented interesting subjects which our members have enjoyed. A talk on synchronous motors was given by M. C. Abrahm of the New Orleans Public Service, Inc. Mr. Abrahm needed no introduction as he has, in the past, delivered numerous educational talks on various subjects to our members. W. S. Galloway, staff lubrication engineer of the Gulf Refining Co., delivered a talk on lubrication in the refrigerating industry which was well received by the chapter.

From the Southern Regional Research Laboratories, T. J. Fynn came to give us a demonstration of very rapid freezing in liquid air. Many substances undergo interesting and often startling changes when frozen rapidly or when their temperature is greatly reduced.

Mr. Fynn showed how blossoms instantaneously frozen retain their color and shape. Some minerals, however, change color and the properties of various common substances such as rubber, mercury, kerosene and alcohol are considerably altered when their temperature is reduced close to absolute zero.

Letters received from National officers and out of town guests expressed the opinion that the convention held in New Orleans last month was the best they had attended in a number of years. We were very happy to receive these reports as the committee members worked very hard to insure that every detail was taken care of and that the guests were entertained royally. The chapter wishes to express its thanks to all who gave so much of their time and effort to insure the success of the convention.

Los Angeles

By FRED HERR

Unfurling of the national membership pennant, emblematic of the chapter's second successive victory in the annual drive for new members, highlighted the program at Los Angeles Chapter's December 1 meeting at the Terminal Club, Los Angeles.

President Donald M. Byl accorded to Frank R. Elliot, chairman of the membership committee which successfully conducted the local campaign, the honor of hanging up the new 1949 pennant on the wall of the meeting room.

Two new members were admitted at the December 1 meeting. These were George T. Dibble of the Jensen Machinery Company, and Harry M. Stemm of Baker Ice Machine Company. Even illness, apparently, does not subdue the enthusiasm of members of Elliot's committee, for Stemm was signed up by Clifford C. Nordholm when he visited the latter at his home, where Cliff is confined with a heart ailment.

Regis Gubser of the California Consumers Corporation gave a report of the educational phases and technical papers presented at the New Orleans convention. E. T. Quinn reviewed business matters transacted at the convention, and Herb Royden described some of the refrigeration plants visited by delegates in the southern city.

Evaporative pressure regulators was the subject discussed by Class Instructor Elmer Johnson during the preliminary class.

The speaker of the evening was Robert L. Simpson of the Pacific Telephone and Telegraph Co. His subject was "The Coaxial Cable."

The following new 1949 officers were elected and installed at the December 15 meeting in the Terminal Club:

President, Rudi Kettler, Fairbanks-Morse Co.
First vice-president, Dale Rycraft, Peterson Mfg. Co.
Second vice-president, Elmer Johnson, California Consumers Corp.
Executive-secretary, George H. Paulick, California Consumers Corp.
Treasurer, E. T. Quinn, Pacific Fruit Express.
Sergeant-At-Arms, Joseph Granger, City Ice Co.

The 1949 term will mark Emmet Quinn's 27th consecutive year as an officer of the chapter, for which he has served as treasurer for the past decade. He has served as president, secretary or treasurer of the chapter since its foundation 27 years ago.

For chairman of the board of directors, the membership approved the choice of W. F. Losch's nominating committee and voted that important post to popular Ralph Westcott of the Westcott Co. Other new members of the board are C. C. Nordholm, Baker Ice Machine Co., Mike Julius of California Consumers Corp., and R. A. Parker of Union Ice Co.

Donald H. Byl of the Union Ice Co. was named chairman of the Advisory Board, with past-presidents Ralph Moore of California Consumers and M. E. Bell of Eastside Brewery Co. as members.

Ralph Westcott served as master-of-ceremonies at the installation of the new officials.

Incoming President Kettler announced the following committee appointments: Entertainment: Dale Rycraft, chairman; F. J. Eccleston, Larry Ewing, L. H. Benedict and C. C. Nordholm. Finance: W. F. Losch, chairman; H. W. Hawkins, and Ed L. Nelson. Attendance: John Anthony, chairman; W. W. Perry, Roy Talley, Murray A. Juhl, and R. L. Maple. Educational: Regis Gubser, chairman, H. N. Royden, W. F. Losch, Frank R. Elliott, Dale Rycraft, Ralph Westcott and M. E. Bell.

Membership: W. R. Burnett, who, as chairman of the 1947 membership committee, brought a national membership campaign pennant to the chapter, was named chairman of the membership committee. His associates are Ralph Moore, Donald H. Byl, C. C. Nordholm and Frank G. Hooper.

Elmer Johnson was re-named class instructor for the year 1949 and was paid the splendid tribute of a rising vote of thanks by the membership for the services he had rendered the chapter during the past year.

The speaker at the December 15 meeting was Herman Vetter, a Los Angeles consulting engineer, who presented a talk on "Basic Problems of Piping," illustrated with slides.

Chicago

By E. B. JONES

The instruction course on low pressure refrigerating systems and other applications has been continued by Eugene Rytlewski. At the frist meeting of the month, Freon refrigerated water coolers were described along with proper design to eliminate troublesome oil accumulation on the low side. It was recommended that a gas velocity greater than 400 ft. per minute be maintained in the coils and connections to carry the oil along with the gas. A water velocity in the cooler from 100 to 480 ft. per minute was recommended and the surface requirements for proper cooling were discussed.

A lively question period developed on shell and tube brine coolers refrigerated with ammonia and Mr. Rytlewski emphasized the economy resulting from maintenance of a high liquid level in the cooler shell.

Detailed reports of the National convention were presented by those who attended, and there was much enthusiasm displayed when it was learned that the 1949 convention will be conveniently close at Purdue University, Lafayette, Ind.

A special quiz program with prizes for the best answers to questions featured the second December meeting. The members of the chapter have become accustomed to well rounded discussion of question box questions and such

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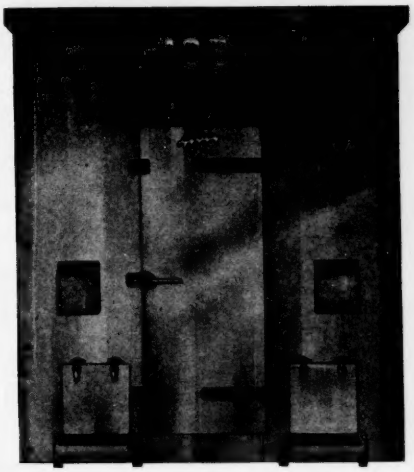

You'll make more sales—AUTOMATICALLY—and thus increase your profits when you have a POLAR Ice Vending Station working for you 24 hours a day. The coin mechanism counts the money deposited by the customer making possible several combinations of coins for one sale. For example, on a 30c sale the customer can deposit a quarter and a nickel; 3 dimes; 6 nickels or 2 dimes and 2 nickels. Similar combinations of silver coins are possible for sales of varying amounts.

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Polar Ice Vending Stations are built of .051 aircraft aluminum inside and out! Aluminum is WEATHERPROOF . . . FIREPROOF . . . DURABLE AND ATTRACTIVE. Always looks bright and new. There is no paint to chip or peel off—so there is NO UPKEEP!

Polar Ice Vending Stations are insulated with 6½" of insulation board and board-form Fiberglas—completely sealed. The refrigeration unit has SURPLUS POWER, is GUARANTEED TO HOLD ZERO TEMPERATURE AT 95° Outside. The proper temperature for ice storage is 26° so you are assured LOW COST OPERATION. And at low temperature storage your profits can't melt away for the ice is always dry.

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subjects presented by the membership. They entered well into the spirit of this meeting and earned attractive prizes as a reward for their answers to the questions.

Seattle

By Texas Cornish

The winner of the free dinner, which is the prize of a drawing held each meeting, was Don McClellan of the Rainier Ice Co. The chapter is meeting at the Y.M.C.A. and is enjoying excellent meals along with a well equipped meeting room.

Special speaker at the meeting was M. W. Allen of the Standard Oil Co. of California. First he showed a technicolor movie, "Arabian Venture," which dealt with the men who went into the desert in search of oil for the Arabian Oil Co. It showed the primitive conditions and extreme hardships which the pioneers in this venture had to endure. Well after well was sunk in the blistering heat of the desert sands and though oil was found, it was not in commercial quantities. After more than two years of heartbreaking disappointment, the first well of which was to prove to be one of the world's greatest oil fields was brought into production. The picture also illustrated how this development has changed the life of the natives. Arabs who previously spent their every waking moment ekeing an existence from the parched and barren land. now live in stabilized communities and enjoy leisure time which they had never known before.

Chairman Robert Rittenburg of the nominating committee presented the slate of nominees for the various offices. The report was adopted and the secretary was instructd to mail a ballot to all members for their vote. The chapter welcomed Robert West to membership.

Memphis

By Chas. Conley

The officers elected to serve the chapter during the coming year were:

President, Wm. K. Brooks
First vice-president, Paul Barth
Second vice-president, Harry Simpson
Secretary, Chas. A. Conley
Sergeant-at-Arms, Wm. L. Parker, Jr.
Chairman, educational committee, Alvis J. Clay
Chairman, entertainment committee, Doug. Smith

The delegates who attended the New Orleans convention gave their reports. They expressed the opinion that the convention was a real success with an interesting educational program and excellent entertainment.

The special subject of the meeting was refrigerant compressors and in the discussion the chapter made good use of the large compressor illustrations furnished through the national office by the York Corp.

Special speaker at the second meeting of the month was Robert H. Schulz, local manager of the Minneapolis-Honeywell Regulator Co., who gave a talk on the various controls his company makes and explained their use.

Electronic temperature indicating and recording equipment was described by Justin Stein, representative of the Brown Instrument Co. which manufactures equipment of this type. Much of the equipment operates from remote temperature elements so that readings from all over the plant can be taken and recorded at a central point.

Pittsburgh

By Louis P. Mantz

In the business meeting, W. M. Owings was initiated and welcomed to membership in the chapter. The entertainment committee reported on its plans for the annual Christmas party to be held at the Fort Pitt Hotel and invited all the members to come and bring their friends. To initiate the Christmas spirit, Ray Leitholf had donated a fruit cake for a door prize which was won by Otto Knoch.

Mr. Leitholf, who is chairman of the local committee on the Operating Data Book, spoke about the 1949 edition and urged all members to do their part in securing as many "ads" as possible. The illustrations of refrigerating compressors furnished by the York Corp. were on display and Mr. Kessel explained the operation of these machines. It is planned to have a special lecture based on these illustrations.

Word has been received that President Frank Sams was married on Thanksgiving Day and the chapter wishes to express its congratulations and best wishes.

Intermittent Service, Ventilating System

A BULLETIN on a cooling and ventilating system suitable for use in homes and small buildings has been published by the University of Texas, Austin, Texas. Developed by the Bureau of Engineering Research of the University under authority of the U. S. Dept. of Commerce, the system combines evaporative cooling supplemented by cooling with ice during periods of high relative humidity.

The bulletin recounts early evaporative cooling methods which have been used for some time in the Southwest. These usually involved crude affairs of a type that could be located in the bottom section of a window equipped with propeller-type fans, and filled with wood excelsior. They usually delivered only a small amount of air and the wet excelsior was subject to deterioration. Furthermore, these evaporative units were greatly reduced in effectiveness during periods of high relative humidity, or when a large number of people were in the cooled space.

There is wide need for an economical cooling unit for homes and small buildings which will utilize evaporative cooling during the relatively long period where it is practical and provides an effective cooling method for the remainder of the time.

The needs of the situation were thoroughly investigated and a design was prepared for a unit combining evaporative cooling with ice cooling. It was determined that a blower of 5,000 cu. ft. per minute capacity would meet the demands of many installations. With the blower as a starting point, a tank unit was designed which would accommodate the blower, 600 lbs. of ice, a centrifugal pump, spray equipment, and appropriate evaporator screens. The entire unit was approximately 6 ft. x 5 ft. x 4 ft. high, and detailed drawings of it are contained in the bulletin. These include drawings of the evaporator screens, adjustable louvres and other features. Glass fiber is used in the evaporative screen and moisture eliminator, because it is not subject to rapid deterioration and offers somewhat less air resistance for a given density of pack than does wood excelsior.

Numerous tests were made on this unit with both ice and evaporative cooling. The results of investigation are given in charts and tables and in summary.

The equipment which, it is estimated, would cost somewhat less than $1,000, produces evaporative cooling equivalent to over 3 tons of refrigeration and with ice it reached a rating of 2.35 tons refrigeration. It is estimated that the seasonal ice cost would be low in areas where evaporative cooling would carry the load for all except 10 to 15 per cent of the cooling period.

University of Texas Bulletin 4813, Intermittent Service, Ice Ventilating System, by James D. McFarland, Harold A. Tankersley and Willis R. Woolrich—50 pages, including drawings and illustrations.

Fred I. McCandlish

THE members of the association learned during November of the death of Fred I. McCandlish following a period of illness at his home in Drexel Hills, Pa. Mr. McCandlish who was 53 years old, served the association as its national president in 1928. For a number of years he was active in the association work and he and Mrs. McCandlish had many close friends among the membership.

In recent years Mr. McCandlish was engaged in advertising work and, while he retained his membership in the association, had not been able to attend the national meeting. His many friends, however, will long remember his genial personality and his substantial contribution to the association.

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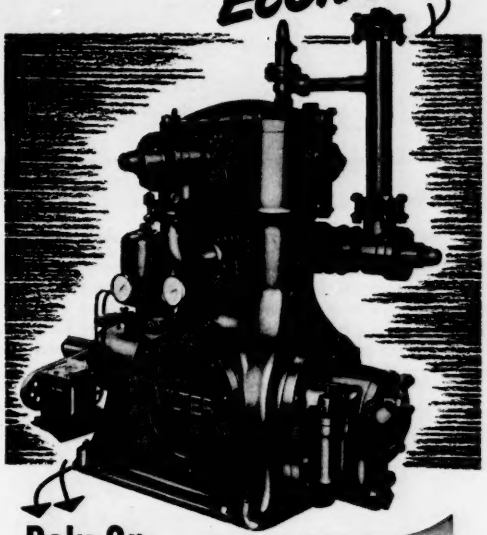

Rely On
VILTER Booster Compressors

Economical low temperature operation is attracting more users to Vilter two-stage compression every day. Vilter was among the first to show how considerable savings in horsepower per ton of refrigeration could be effected with multi-staging. Constant improvement in the production of low temperature equipment has resulted in the Vilter Booster Compressor.

VILTER BOOSTERS STAND UP

Vilter Boosters incorporate outstanding features. A unit casting comprises crankcase and cylinders. The crankshaft uses three bearings—two sleeve and one roller. The lubrication system is completely force fed, using separate oil supply for the cylinder walls. Manual or automatic Capacitrol can be furnished. Reciprocating parts are lightweight.

Vilter Sales and Service Offices in principal cities are ready to help you solve your refrigeration problems. Every Vilter man is a qualified engineer, able to assist you capably. Contact the nearest Vilter Office, or write the factory for Bulletin 703.

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Frozen Foods

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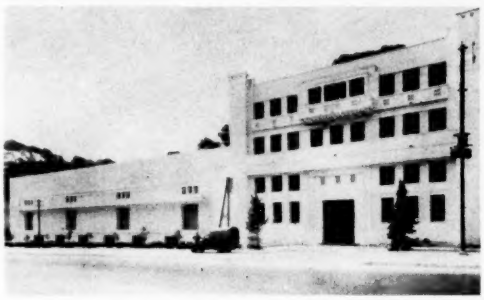
COVERING EVERY PHASE OF THE QUICK FREEZING OF PERISHABLE FOODS—PREPARATION, PACKAGING, FREEZING, STORAGE, DISTRIBUTION, DESIGN, CONSTRUCTION, EQUIPMENT, OPERATION OF LOCKER PLANTS.

New Food Freezing Plant in Algiers

THE first major food processing plant to be established in Algeria, featuring a uniquely designed refrigeration system is now in operation. The plant has been built as the focal point of a postwar food distribution network handling the rich harvests of Algeria's Territories du Nord.



New food processing plant which has just started operation in Algiers. Built on a hillside, all products in process are moved on rollways with gravity for power.

The refrigeration system was designed and installed by Inco (Industrie et Confort), Carrier distributor, of Algiers. By selecting a hillside overlooking the Mediterranean as the site of the plant, its owners have been able to reduce operating costs sharply. The hillside location permits movement of all products in process on rollways, with gravity as the power. At the same time, Inco capitalized on the location to effect substantial economies in the cold storage systems. Ten tunnels were cut into the base of the hill to create cold storage and low temperature refrigeration rooms with exceptional insulation qualities. The plant is equipped to handle sorting, cooking, canning, blanching, freezing and cold storage operations.

Products to be processed are unloaded from trucks at the upper end of the building. They are moved down through the plant on a system of conveyor rollers and processed as they go. After freezing, they are continued on the rollers into one of seven storage tunnels. Each tunnel is served by one condensing unit.

Because of the excellent insulation provided by the hillside rock, a five-h.p. machine does work normally requiring three times that power. Fifty tons of food can be held in each tunnel. Carrier cold diffusers blow low temperature air, at proper humidity, into the tunnels through a duct distribution system.

The refrigeration systems were designed by Ferdinand Macherel, general manager of Inco, who is also technical advisor and consultant to the government of Algeria for air conditioning and refrigeration. The plant was constructed by the Societe Transafricaine d'Echanges Commerciaux Birmandreis under the leadership of Jean Baptiste Germain, chairman, and Andre Bonnome, general manager.

One of the ten cold storage tunnels in which 50 tons of perishables can be held at low cost because of exceptional insulation. Chilled air at proper humidity is distributed evenly throughout the tunnels by means of the overhead duct, shown here, with ejector outlets.

New Freezing Plant

A MODERN 100-foot freezer plant is being constructed at Williamson, N. Y., adjacent to the present Williamson Storage and Ice plant. It will give Williamson one of the largest cooler and freezer plants in the rural areas of Western New York. The new freezer will have a capacity of approximately 100,000 cu. ft. of freezing space and will be used by area farmers for freezing fruit crops, such as cherries and strawberries. Frozen foods in transit will also be stored here for short periods according to Olif Tassell of Williamson, who is generally supervising this new project.

When the original Williamson Cold Storage and Ice plant was built here more than 35 years ago it was reported to be the first one of its kind not only in Wayne County, but in the rural areas of the entire state. Plans call for the completion of this first freezer unit by next June 1. A second freezer unit, which would add another 100,000 cu. ft. capacity is being contemplated for the future.

PALCO WOOL INSULATION PROTECTS PROFITS IN PERISHABLE PRODUCE

Dixie Tomatoes, Inc., packing plant at Memphis, Tenn. 50 ton capacity cooler and storage room insulated with PALCO WOOL. PALCO Redwood Lumber interior and exterior finish.

To prevent spoilage and losses in fresh fruits and vegetables, continuously uniform temperatures must be maintained during processing and storage. PALCO WOOL Insulation offers this dependable protection for chill rooms and cold storage holding areas to safeguard your profits. In addition to being economical to install, PALCO WOOL's efficiency effects further savings through reduced operating costs. Investigate the benefits you will receive from PALCO WOOL Insulation applied to your plant. Write today for the new Plan and Construction Manual.

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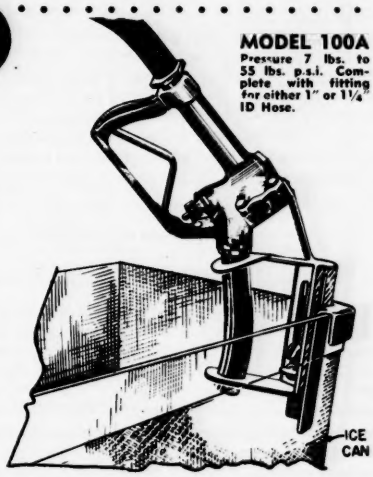
FEATURES:

- ADJUSTABLE FOR ANY SIZE CAN
- AUTOMATIC UNIFORM CONTROL OF WATER LEVEL
- LIGHT — YET STURDY AND DURABLE
- FILLS 100 LB. CAN IN 1 MIN. (at 40 lb. p.s.i. Water Pressure)
- ALL PARTS NON-CORROSIVE
- FULL GUARANTEE AND FIXED PRICE REPLACEMENT PROGRAM



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Pressure 7 lbs. to 55 lbs. p.s.i. Complete with fitting for either 1" or 1¼" ID Hose.

The RECO, Universal Type, Automatic Ice Can Filler is suited for rapid, convenient and accurate filling of cans in the Freezing Tank. This assures the user of uniform Ice Blocks of correct weight.

FILLER IS EQUIPPED WITH AN ADJUSTABLE CAN HANGER. Adjustment is simple and accomplished in a matter of a minute or two to give a wide range of water levels. THE SPECIAL PATENTED MECHANISM which shuts the water inlet when the desired water has been reached OPERATES AUTOMATICALLY. Fillers are covered by our liberal factory warranty and replacement exchange service.

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- CAN DUMPERS
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- GENERAL ICE PLANT SUPPLIES

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Frozen Food Industry Plans Big Convention and Exhibit

UNIFICATION will be the keynote of the third annual national convention and exposition of the frozen foods industry to be held March 7 to 10 at the Stevens Hotel in Chicago. Announcement of plans reveals that all units of the industry have united to conduct the largest, most comprehensive and most diversified all-industry frozen foods convention and show ever projected.

Joint sponsors are the National Association of Frozen Food Packers, National Wholesale Frozen Food Distributors, Inc., National Association of Refrigerated Warehouses, National Preservers Association, National Food Brokers Association and the Quick Frozen Food Association of Chicago.

Named as chairman is Fred J. Becker, president of the packers association. W. L. Pavlovski, president of the Quick Frozen Food Association of Chicago, will officiate as secretary of the joint promotion.

Others serving on the general committee are William M. Walsh, president, National Wholesale Frozen Food Distributors, Inc.; Fred M. Deutsch, Marathon Corporation, representing the exhibitors; Edgar M. Burns, president, National Association of Refrigerated Warehouses; T. N. St. Hill, president, National Preservers Association and Watson Rogers, National Food Brokers Association.

One general session will be conducted this year. This is set for Tuesday afternoon, March 8. This meeting will be limited to short talks by men in the industry about affairs of the industry.

Group sessions will include the annual meetings of the National Association of Frozen Food Packers, the National Wholesale Frozen Food Distributors, Inc.; and the National Preservers Association.

Packers will be permitted to exhibit for the first time as a group. Although many packers wished to exhibit their products at the first two shows they were not privileged to do so. But this year the committee consented to grant them the same recognition in this respect as all other groups. Products to be shown by the packers will include frozen foods, vegetables, frozen fruits, berries, juices, meats, poultry, pre-cooked food and specialties.

In addition to products shown by the packers, exhibitors will present the latest developments in equipment, machinery, supplies, materials and services used by the packers of frozen foods.

Heuser Becomes ACRMA Treasurer

THE election of G. A. Heuser, president of the Henry Vogt Machine Co., Louisville, Ky., and a prominent figure in Kentucky business circles, as Treasurer of the Air Conditioning and Refrigerating Machinery Association, has beeen announced. The Henry Vogt Machine Co., has been a producer of large industrial refrigeration equipment for almost half a century and Mr. Heuser has been associated with the company for a greater portion of that period. He assumed the company presidency following the death of its founder, Henry Vogt, in 1937.

In addition to his activities in connection with the refrigeration industry, Mr. Heuser is president of the National Realty Company and a Director of Merchants Ice & Cold Storage Co., the Louisville Safety Council, the Louisville Board of Trade, and the Associated Industries of Kentucky. He is also a member of the Industrial Advisory Committee of the Federal Reserve Bank of St. Louis. Mr. Heuser takes an active part in civic welfare projects and is probably best known in this field as president of the Masonic Widows and Orphans Home of Kentucky.

American Society of Refrigerating Engineers, Annual Meeting

THE forty-fourth annual meeting of the American Society of Refrigerating Engineers was held in Washington, D. C. on December 6, 7, 8. The business of the association was transacted and officers were elected. There were four technical sessions including a conference on domestic refrigerator design and production which proved to be the feature event for the engineers in attendance.

Food freezing and storage had an important place on the program with four papers on different phases of the subject. J. G. Woodroof, Georgia Agricultural Experiment Station described the effects of storage temperature and time upon certain fruits and vegetables. The relationship of storage temperature to characteristics of frozen pork was discussed in a paper by Gladys Vail of the Kansas Agricultural Experiment Station. Effects of fluctuating storage temperature in frozen foods were reported in a paper by Andrew Hüstrülid et al of the University of Minnesota. The effect of freezing rate on vegetables was described by F. A. Lee, New York State Agricultural Experiment Station.

Refrigeration equipment and appliances were the subjects of several papers. Tests on new ice and salt mixtures for refrigerator cars were reported. A study of ultra rapid cooling and the preservation of life indicated that such processes are presently confined to minute living organisms.

Officers

The following officers were elected for 1949.
President, B. H. Jennings, Evanston, Ill.
Vice-president, John G. Bergdoll, York, Pa.
Vice-president, Edward Simons, San Francisco, Calif.
Treasurer, P. B. Christensen, New York, N. Y.

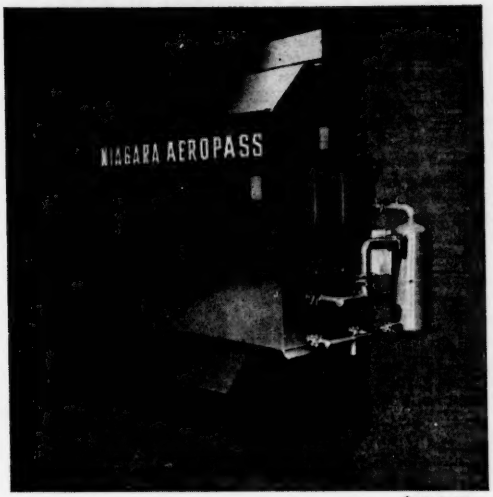
Chicago Section—A S R E

THE entire refrigeration industry is dependent to a certain extent upon the service organizations throughout the industry. So stated Wm. M. Prack, service manager of Refrigeration Maintenance Corp., at the December meeting of the Chicago Section, American Society of Refrigerating Engineers.

Too often, he said, a service group is beset by ills easy to acquire but fatal if allowed to continue unchecked. Some of these bad practices, common to all organizations, are (a) Poor training of servicemen both during apprenticeship and afterward, (b) Inadequate stock of replacement parts, (c) Incomplete shop facilities, (d) Insufficiency of information relayed back to manufacturer or installation department in cases where field conditions require reporting.

On the credit side Mr. Prack reported the existence of many fine service departments which have successfully overcome the foregoing pitfalls and are enjoying good business with the help of good organizational structure, and good inter-departmental coordination. Every person who has any contact with the customer, from the call-taker to the field supervisor, is equally important to the success of negotiations. In addition a close relationship between manufacturing, sales, installation and service departments is absolutely imperative.

Mr. Prack predicted a brilliant future for any company willing to devote itself wholeheartedly to the above rules, learned in his long years of experience. Individuals, too, can look forward to success, inasmuch as there is always a shortage of good men, even during a depression.



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New Condenser Cuts Refrigeration Costs Saves Cooling Water

● The Niagara Aeropass Condenser cuts the cost of refrigeration by running compressors at lower head pressure, saving up to 35% of power.

The refrigerant gas passes thru two coils in an air stream. The first, "Duo-Pass"* dry coil, removes the superheat by air cooling and condenses oil vapor. The second, condensing coil, drenched by recirculated water spray, condenses by evaporation, transferring to the air 1,000 BTU for every pound of water evaporated and saving more than 95% of the water used by water-cooled condensers. This done at low temperature, no scale forms on condenser tubes to clog air passage.

Between the two coils is the "Oilout"*, which purges the system of crankcase oil and dirt, keeps it always at full capacity.

The "Balanced Wet Bulb"* control holds head pressure low, automatically giving the full benefits of power saving in cool weather and providing always full capacity for peak loads.

Niagara Aeropass design results from over fifteen years' experience condensing by air. It is completely trustworthy for year' round operation. Users say, "It saves half the difficulties and labor of running a refrigeration plant."

Units range from 10 to 100 tons capacity.
For full information ask for Bulletin 103.

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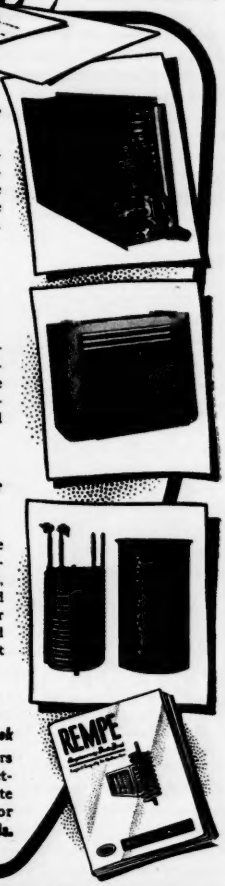

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Book Review

REFRIGERATION AND AIR CONDITIONING. By Richard Jordan and Gayle Priester. 512 pages. Published by Prentice-Hall, Inc., New York. Price $7.75. For sale by Nickerson & Collins Co., Chicago 44, Ill.

This book is designed: to serve as a college text for senior and graduate study and to serve as a reference for the practicing engineer. The theoretical portions of the text assume that the reader has studied physics and mathematics, and one chapter contains a review of thermodynamics. Various chapters of "Refrigeration and Air Conditioning" review the history and potentialities of the refrigeration field and discuss the latest applications of frozen foods, air conditioning and the heat pump, and medical and surgical uses of refrigeration. One chapter is devoted to an introduction of the basic refrigeration cycles and systems through a series of sequence drawings.

Theory, application, and equipment are segregated into separate sections. Descriptive material on equipment follows closely after the presentation of theory applied to such equipment. Problems, answers, line-drawings, illustrations, charts, graphs, tables, footnotes, and bibliographies accompany the text. Various charts of the refrigerants: ammonia, Freon 11, Freon 12, Freon 22, and carbon dioxide are contained in a pocket in the back of the book. The appendix includes tables of the properties of many of the common refrigerants as well as auxiliary data.

Dr. Jordan is professor and assistant chairman of the department of mechanical engineering at the University of Minnesota, Minneapolis, and Mr. Priester is an air conditioning engineer for the Consolidated Gas, Electric Light & Power Co., Baltimore, Md.

HANDBOOK OF REFRIGERATION ENGINEERING. (Third Edition.) By W. R. Woolrich, Dean of Engineering, University of Texas, and Luis H. Bartlett, Engineering Experiment Station, Louisiana State University. Published by D. Van Nostrand Co. Inc., New York. 730 pages. Illustrated. Price $8.50. For sale by Nickerson & Collins Co., Chicago 44, Ill.

This third edition, following the second edition which was published in 1938, has been completely rewritten, because of the tremendous strides made in the low temperature field. Notable among these advances are the increase in the food freezing industry and the rapid spread of locker plants, summer air conditioning, low temperatures in process industries, and development of refrigerated warehouses. These advances and their influence upon newer refrigerants and refrigerating equipment and processes are well covered in this volume which will bring the student up-to-date in this rapidly expanding industry.

THEORY AND PRACTICE OF HEAT ENGINES. By Virgil Morning Faires, Professor of Mechanical Engineering, A & M College of Texas. Published by MacMillan Co., New York. 390 pages. Illustrated. Heavy cloth binding. Price $5.00. For sale by Nickerson & Collins Co., Chicago 44, Ill.

This book was designed primarily for students taking a course in heat power although it is offered also as a preliminary course to theoretical thermo-dynamics. Knowledge of the application of the law of conservation of energy is considered sufficiently important as a tool of the heat engineer to make a special effort to implant this in the student's mind and to this end the general energy equation is set up and applied a number of times. At the end of each chapter, a set of problems is given most of which have answers. An alphabetical index provides ready reference to specific information.

Jennings Elected President of ASRE

AT THE annual meeting of the American Society of Refrigerating Engineers held at Washington, D. C., December 5-8, Prof. Burgess H. Jennings, Chairman of the Department of Mechanical Engineering, Northwestern University, was elected president.

Burgess H. Jennings

Prof. Jennings, who makes his home in Evanston, has been chairman of the mechanical engineering department at Northwestern since 1940 and previously taught at Leheigh University. During the war he was connected with the Office of Research and Development of the U. S. Government and supervised work on glycol vapor which is now being used in ventilating systems to kill cold germs.

Prof. Jennings is also president of Pi Tau Sigma, honorary mechanical engineering fraternity, and is a past chairman of the Chicago section of the American Society of Heating and Ventilating Engineers.

Ice Cream Cabinet Manufacturers Affiliate with ACRMA

FOLLOWING a meeting of the manufacturers of ice cream cabinets at the Palmer House, Chicago, December 13, announcement was made that the industry will carry on its trade association work as a product-section of the Air Conditioning and Refrigerating Machinery Association of Washington, D. C. The major objectives will be in the areas of statistical and market research, improvement of product design, and expansion of the product's field of use. H. L. Schaefer, president of Schaefer, Inc., Minneapolis, Minn., was elected vice-chairman of the product-section.

Sales and Reorganizations

San Jacinto, Calif.—H. E. Freeman, who recently moved here from San Diego, has taken over the distributorship of the San Jacinto Ice Company which has been operated by his brother, J. D. Freeman.

Cochran, Ga.—The sale of the Colonial Packing Co., by Mayor James Dykes to Harry Williams, prominent stock auctioneer, has been completed. Mr. Williams announces he will continue all departments of this business.

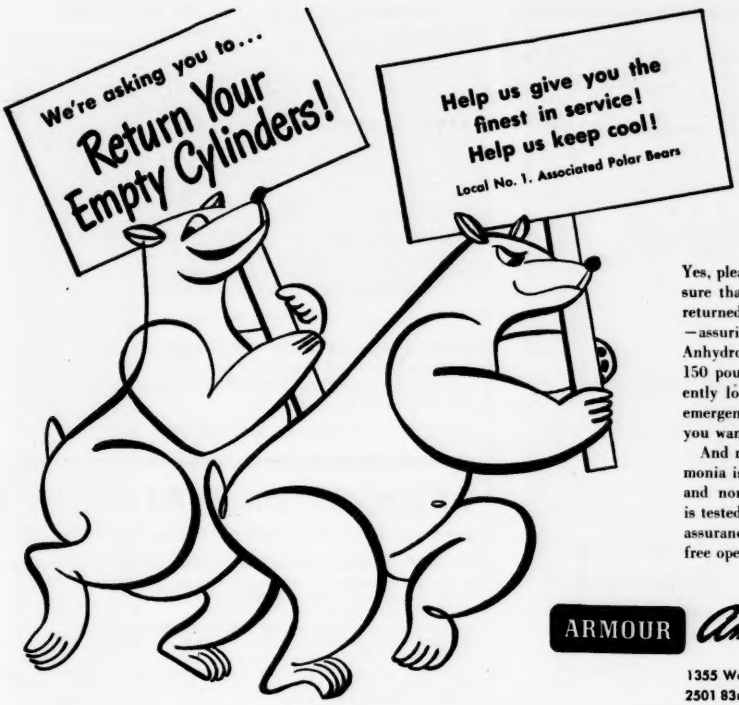
St. Joseph, Mo.—John and Alvin Redmon have sold the Redmon Ice Co. plant to Otho Scarbrough.

Sidney, Nebr.—H. C. Byrd, formerly of Albuquerque. N. M., is the new manager of The Western Ice and Storage Co. here.

Myrtle Beach, S. C.—Taylor Ice Cream Co. has leased the cold storage warehouse at the Myrtle Beach Municipal airport which was formerly used to store food for the army while the Myrtle Beach Air Base was active.

New Incorporation

Bloomfield, Ind.—Announcement has been made of the recent incorporation of the Bloomfield Packing Co. by four incorporators, R. E. Cardwell, Leland Hawkins, Leonard Mann and Curtis Sparks. Mr. Hawkins, who made the announcement, stated that the assets of the former Greene County Packing Co. had been leased.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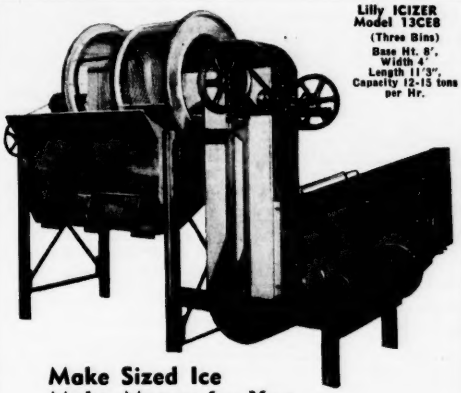

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Willshire Riley, Secretary-treasurer

SOUTHERN ICE EXCHANGE
January 19 and 20, 1949
Ansley Hotel, Atlanta, Ga.
Willshire Riley, Secretary-treasurer

ILLINOIS ASSOCIATION OF ICE INDUSTRIES
January 20-21, 1949
St. Nicholas Hotel, Springfield, Illinois
W. D. Wright, Secretary

OKLAHOMA ASSOCIATION OF ICE INDUSTRIES
January 24-25, 1949
Biltmore Hotel, Oklahoma City, Okla.
W. A. Hadley, Secretary

MISSOURI ICE MANUFACTURERS ASSOCIATION
February 2, 3, 4, 1949
Hotel President, Kansas City, Mo.
V. A. Esphorst, Secretary-treasurer

INSTITUTE OF AMERICAN POULTRY INDUSTRIES
1939 Fact Finding Conference
February 6-8, 1949
Municipal Auditorium, Kansas City, Mo.
Dr. Cliff D. Carpenter, President

KANSAS ASSOCIATION OF ICE INDUSTRIES
February 7-8, 1949
Hotel Allis, Wichita, Kans.
C. A. Berkihiser, Secretary

NATIONAL ASSOCIATION OF REFRIGERATED WAREHOUSES
February 7-10, 1949
Fairmont Hotel, San Francisco, Calif.
William Dalton, Exec. Vice-president

MICHIGAN ICE INDUSTRIES ASSOCIATION
March 3-4, 1949
Hayes Hotel, Jackson, Mich.
Wm. J. Campbell, Secretary

NORTH CAROLINA ICE ASSOCIATION
March 6-8, 1949
Sheraton Hotel, High Point, N. C.
Lewis H. Powell, Secretary

NATIONAL ASSOCIATION OF FROZEN FOOD PACKERS
March 6-10, 1949
Stevens Hotel, Chicago, Ill.
E. J. Becker, President

CANADIAN ASSOCIATION OF ICE INDUSTRIES
March 7-11, 1949
Hotel Vancouver, Vancouver, B.C., Canada
K. C. McCrea, Secretary

EASTERN STATES ICE ASSOCIATION
March 31-April 1, 1949
Hotel Haddon Hall, Atlantic City, N. J.
Samuel Freer, Secretary-treasurer

VIRGINIA ICE MANUFACTURERS' ASSOCIATION
March 31-April 1, 1949
Haddon Hall, Atlantic City, N. J.
H. H. Snyder, Secretary

INDIANA ASSOCIATION OF ICE INDUSTRIES
April 12-13-14, 1949
French Lick Springs Hotel, French Lick, Ind.
O. P. Fauchier, Secretary

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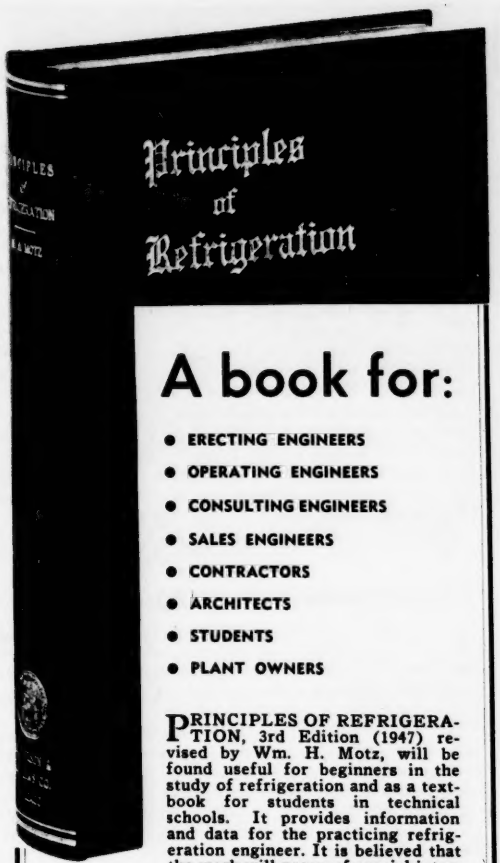

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PRINCIPLES OF REFRIGERATION, 3rd Edition (1947) revised by Wm. H. Motz, will be found useful for beginners in the study of refrigeration and as a textbook for students in technical schools. It provides information and data for the practicing refrigeration engineer. It is believed that the work will prove of special interest to erecting and operating refrigerating engineers, refrigeration machinery sales engineers, persons employed in building refrigerating machinery and those employed in ice making, cold storage plants or other establishments equipped with refrigerating machinery. In general the work contains information that is necessary the refrigerating engineer should know in order that he may have complete and up-to-date knowledge of the theory and practice in this field of endeavor.

The work is in every day language and as free as possible from higher mathematics. The method of treatment has been to present a comprehensive treatise on the fundamental principles. With a firm grounding of these fundamental principles the practitioner is enabled to intelligently design or operate refrigerating machinery. The theoretical and fundamental operating principles are given attention first. This is followed by numerous practical considerations and the application of the fundamental principles to the economic production of ice and refrigeration for various purposes.

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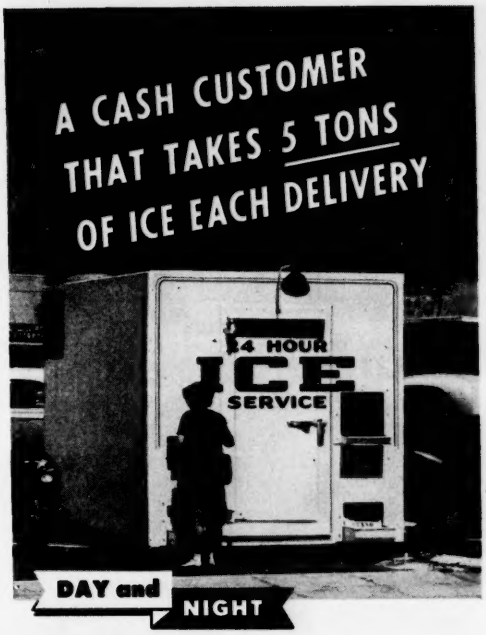

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Highland Park Station
Des Moines, Iowa

NEW PLANTS AND IMPROVEMENTS

Information pertaining to proposed new plants, utilizing refrigerating equipment, as well as additions, improvements, and rehabilitation of existing plants. News items of such new plants and additions is invited for publication in this department.

CALIFORNIA

Long Beach, Calif.—A Land-use permit has been granted to Paul Hosman to build an ice plant at Laguna Canyon Road, southwest of Woodland Drive, Laguna Canyon.

GEORGIA

Alma, Ga.—The South Georgia Ice Co., the only ice manufacturing firm in Bacon County, recently opened a freezer-locker plant here. There are 734 lockers.

ILLINOIS

Springfield, Ill.—Central Illinois Ice Co. is now operating an S & S Ice Vending Station, Model 20-B. This unit, supplied by F. B. Dickinson & Co., Des Moines, Iowa, is equipped to sell 25 and 50 lb. pieces of ice and also 10 lb. bags of prepared "party" ice.

INDIANA

New Albany, Ind.—The National Ice & Products Co. has added an entire room to hold over 300 lockers. This company has established a growing trade by processing and supplying customers with beef, pork and poultry.

KANSAS

Ashland, Kans.—Ashland Ice & Coal Co. is now operating an S & S Automatic Ice Vending Station. The unit, Model 20, was delivered from the Des Moines, Iowa, plant of F. B. Dickinson & Co.

NEW YORK

Williamson, N. Y.—A modern 100 ft. freezer plant is being constructed by the Williamson Storage & Ice Plant. It will have a capacity of approximately 100,000 cu. ft. A second unit of the same size is being contemplated for the future.

WISCONSIN

Milwaukee, Wis.—During the past 60 days, Wisconsin Ice & Coal Co. has completed installation of two S & S Sturdy-Built Automatic Ice Vending Stations. Both units are equipped to sell packaged ice as well as 25 and 50 lb. pieces.

Fires and Accidents

Long Beach, Calif.—Frozen food, largely meat for the Navy, went up in flames recently when a fire gutted a frozen foods warehouse at 1162 West Ocean Bldg. Wm. D. McKillip, owner of the building, estimated damage at $25,000.

Wheatley, Ont., Canada—All packing and freezing facilities of the Omstead Fisheries were destroyed December 10 in a fire which razed the whole second floor of the main fisheries building. Loss was estimated at $65,000.

Cincinnati, Ohio—A storage shed at the rear of the City Ice & Fuel Co., 3307 Spring Grove Ave., burned recently, causing $1,000 damage.

Newport, Vermont—Damage estimated at $20,000 was caused by a fire December 3 which destroyed the 250 x 50 ft. building and all equipment. The cause was not determined.

Milwaukee, Wis.—A fire doing an estimated $25,000 damage burned an ice storage house at the Random Ice & Coal Co. The empty building, which was being repaired after damage by a recent windstorm, is at the rear of 1300 E. Locust St. near the Riverside pumping station.

Icy Item

Springfield, Ill.—The American Ice & Fuel Co., has filed notice with the Secretary of State's office for dissolution of the corporation.

OBITUARY

Louis J. Bergenroth, Deceased

THE death of Louis J. Bergenroth, former secretary-treasurer of the B & B Ice & Coal Co., Louisville, Ky., occurred at his residence Monday, December 6, shortly after suffering a severe heart attack. He was 63 years old. Mr. Bergenroth retired about three years ago when the B & B Ice & Coal Company properties were sold to settle the estate of Claude Boone his partner in business for thirty-five years.

From an humble start in the ice business, Mr. Bergenroth climbed the ladder of success until he held interest in five Louisville ice plants and one in Tampa, Fla. He also held an interest in the B & B Office Equipment Co. and B & B Motors, Chrysler and Plymouth agency.

He was an active member of the Kentucky Ice Manufacturer's Association and only a few days before his death attended the annual convention, meeting and greeting his many friends. He was a member of the Church Council of the Fenner Memorial Church for 30 years, a member of the Shawnee Lodge of Masons, and of Kosair Shrine.

William V. Kelly, Deceased

THE DEATH of William V. Kelly, age 55, well known ice manufacturer of Birmingham, Ala., occurred Tuesday, December 7, of a heart attack. Mr. Kelly was born in Mobile, but came to Birmingham in 1917, where for a number of years he was associated with the Davis Ice Co., which was then known as the Centennial Ice Co. He was later employed as an erecting engineer for The Vilter Manufacturing Co. of Milwaukee, Wis., during which time he erected many plants throughout the southeastern territory and Latin America. In 1932 he built his own plant in Birmingham, which he operated as Kelly's Ice Factory until the time of his death.

Mr. Kelly was an active member of the National Association of Ice Industries and the Alabama Association of Ice Industries, and at one time served as treasurer of the latter organization. He is survived by the widow, Mrs. Annie Mae Kelly, one brother, Joseph E. Kelly, and two sisters.

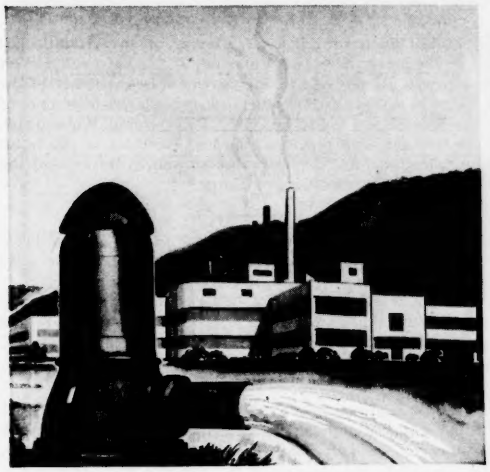
Paul C. Jones Deceased

THE death of Paul C. Jones, president of Richmond Cold Storage Inc., occurred at Richmond, Va., Saturday, November 27 at a Richmond hospital. He was 52 years old.

Mr. Jones was secretary of Penas de Hicacos of Varaduro, Cuba, from 1928 to 1936; chairman of the board of Terminal Warehouses, Ltd., of Toronto, Ont., Canada from 1936 until 1939 and president of Dominion Rubber Co., Ltd., Montreal, Que., Canada from 1939 to 1944.

He was born in Virginia and returned as president of the Richmond Cold Storage Co., in 1944. Surviving are his widow, Mrs. Mary Hall Jones, two sons, Hall B. and Christopher H.

THOMAS G. HANCOCK, 74, who owned the Bunker Ice Co. in Georgetown, Mass., before retiring from business in 1934, died December 8 at his home in Winthrop, Mass. Surviving are his wife, a daughter and one son.



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There are some mighty good reasons why so many cities and industries use Layne Well Water Systems exclusively. Two of these reasons are:—finer design for higher efficiency and extra rugged construction to assure longer life.

Every part of a Layne Well Water System is severely tested for accuracy, strength and quality. Where strain is heaviest, extra strength has been added. To excessive points there is more toughness.

All in all your Layne Well Water Systems are as fine as modern skill and advanced engineering can create. Their reputation for extraordinarily satisfactory service under any and all conditions is world known.

If you are in need of more water, a Layne engineer may be called in without cost or obligation. If you want literature address LAYNE & BOWLER, INC., General Offices, Memphis 8, Tenn.

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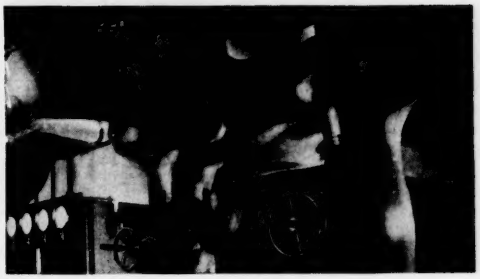
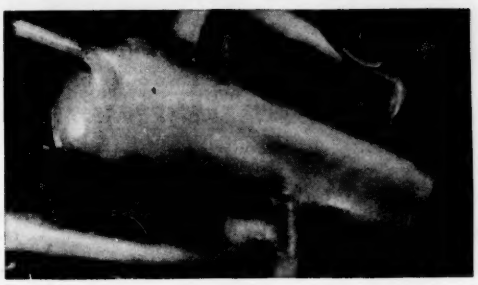
No shape is

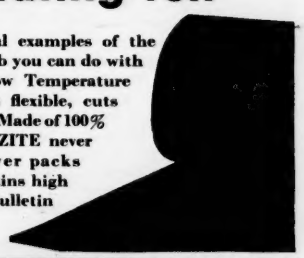


too complex for

OZITE Standard



insulating felt



These are typical examples of the smooth insulating job you can do with OZITE Standard Low Temperature Insulating Felt. It's flexible, cuts easily, goes on easily. Made of 100% select cattle hair, OZITE never rots or decays, never packs down, always maintains high efficiency. Write for Bulletin No. 300.

AMERICAN HAIR & FELT COMPANY

DEPT. L91 MERCHANDISE MART CHICAGO 54, ILLINOIS

Grant M. French, Deceased

THE death of Grant M. French, manager of the Liberty Fuel & Ice Co., Portland, Ore., occurred December 8. He had gone into a Portland hospital for an emergency operation about a week before his death.

Mr. French spent his early life in railroading. Previous to becoming associated with the ice industry he was a U. S. Treasury inspector. After leaving the government's employ, he became office manager for the Davidson Ice Co., and joined the Liberty Fuel and Ice Co., in 1945 when that company took over the Davidson concern. He was a member of the Northwest Association of Ice Industries.

ALGERNON B. ALEXANDER, 70, former ice manufacturer at Boonville, Ind., died recently at his home in Danville, Ill., after an illness of more than a year. For a number of years he owned and operated the plant of the Warrick Ice & Cold Storage Co., at Boonville and he was widely known to the trade in southern Indiana and northern Kentucky. He sold the business a few years ago to the late Walter Huthsteiner, of Tell City, Ind. The business is now owned and operated by Mr. Huthsteiner's son, Clark.

HARPER T. SWEENEY of Salem, Ill., who had been in business in Salem for sixty-five years died Sunday, December 5. He had operated a mercantile store and then for many years stored and sold ice. An item in the "Fifty Years Ago" column of the local newspaper tells of his preparation for cutting ice in December, 1898.

Edgar W. Davies, Deceased

THE death of Edgar W. Davies of the Atlantic Ice Manufacturing Co., Vineland, N. J., occurred Friday afternoon December 17. Mr. Davies was a member of the National Association of Refrigerated Warehouses and of the New Jersey Association of Refrigerated Warehouses. He was a member of the board of directors of the latter organization. Mr. Davies was well known throughout the refrigerated warehousing industry.

EDWARD CAINE, SR., 61, proprietor of the Cornwall Ice Co., Cornwall, Ontario, Canada, died within a few minutes at his home October 30 following a sudden heart attack. He was the son of the late Neil Caine, who founded the business and was born at Niagara Falls, N. Y. His widow, the former Esther Votra, of Hopkinton, N. Y., survives, with a son and two daughters.

FRANK A. KEARNEY, an engineer for the Consumers Coal and Ice Co., Memphis, Tenn., died suddenly while at work October 16. He was 75 years old. Mr. Kearney was born in Lexington, Ky. and came to Memphis from Detroit ten years ago.

FRANK KINDER, an ice and coal dealer in Beckemeyer, Ill., died October 9 from the effect of a stroke he had suffered several days earlier. He was 69 years old. He leaves his widow, Mrs. Albina Kinder, and two daughters, Mrs. Dolores Van Dorn and Mrs. Al B. Kampwerth.

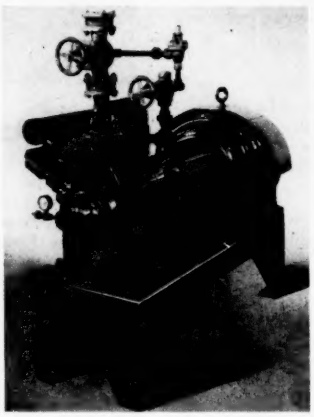
NEW AND IMPROVED EQUIPMENT

MACHINERY-APPLIANCES-PROCESSES

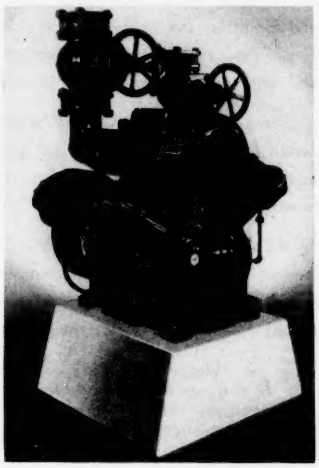
Information contained in this department is furnished by the manufacturer of the article described and is not to be construed as the opinion of the Editor.

New Ammonia Compressors

A NEW line of multi-cylinder ammonia compressors has been announced by the Creamery Package Manufacturing Co., Chicago. These compressors, which are designated as Type "K" are made in 4 and 6 cylinder models for both booster and single stage service. The manufacturers announce these machines after three years' work in the laboratory and in the field. The features of these machines as described by the manufacturers include automatic unloaded starting and automatic capacity control; reliable shaft seals; forced feed lubrication with self cleaning oil filter and built in oil cooler. Single stage compressor cylinders have water jackets with cover plates for inspecting and cleaning and the whole design is simple and accessible for convenient inspection and service.



C. P. Multi-cylinder Ammonia Compressor—Type K. This single stage machine has 6 cylinders—3½ x 3½ in.



C. P. Multi-cylinder Booster Compressor—Type K. With 6¾ in. bore and 5 in. stroke, this 6 cylinder compressor is designed to raise low pressure ammonia vapor to the intermediate pressure of the second stage suction.

There are three sizes of single stage compressors: a 5x5 in. six cylinder machine, 3½x3½ in. machines in four and six cylinder models. The booster compressors are three in number with a 6¾x5 in. six cylinder machine

TROUBLES?

THIS IS WHAT YOU'VE BEEN WAITING FOR . . . A BAG TYING MACHINE THAT WILL INCREASE YOUR OUTPUT AND SAVE LABOR COSTS

LITTLE GIANT BAG TYING MACHINE

Yes . . . this trouble saver will tie 750 bags of any size or type in one hour. A neater and more efficient job that is making a hit with jobbers and manufacturers everywhere. Write today for our illustrated folder.

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REFRIGERATOR FAN

KEEPS FROST FROM COILS
INSURES COMPLETE CIRCULATION
DISSIPATES ODORS
KEEPS COOLER DRY

Write for Bulletin 241 giving prices and complete information

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THOMAS

For both Manual and Power Hauling

Double Purpose:
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JAK-TUNG TRUCKS

A tested Thomas design, for power truck, hand lift truck and Jak-Tung operation. For long hauls use a power truck, for short movements and spotting of loads use a Jak-Tung lift unit. This dual purpose Jak-Tung truck thereby gives more flexibility and efficiency than dead skids. Avoid waiting for power unit—reduces number of lift trucks needed. Lifts from any angle. Write for catalog.

Representatives in principal cities.

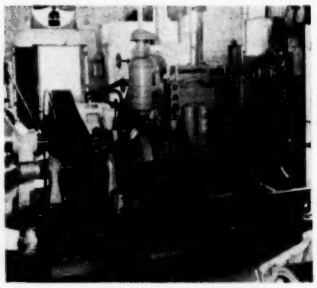
THOMAS TRUCK AND CASTER CO

3189 Mississippi River — Keokuk, Iowa

and two 5x3½ in. machines in four and six cylinder models. All of these are designated as type "K" compressors and are described in Bulletin V-18.

The company continues to manufacture its vertical compressors in a size range from 3x3 in. to 10x10 in. The smaller models in this line are available also in self-contained units. These vertical machines are described in bulletin B-99 available from the Creamery Package Manufacturing Co., 1243 W. Washington Blvd., Chicago 7.

New Diesel Power For Ice Plant



View of the new caterpillar Diesel engine powering Frick compressor for the manufacture of ice at the Vero Beach Ice & Storage Co., Inc. of Vero Beach, Fla. The entire plant operation is powered by Caterpillar Diesel engines and electric sets. Below is a front view of the Plant.

Drum Carrier Attachment For Fork Trucks

THE Tray-Hart Multiple Drum Carrier, designed to pick up, carry and tier two or four 55-gallon drums without the use of a pallet, is now listed among the special handling attachments for use on Clark fork trucks. The device fits over the top of drums, lifts and moves them without need for a pallet. The clamping shoes which grip the drums are actuated by hydraulic power taken from the fork trucks hydraulic lift mechanism. The

Handling two 55-gallon drums with Tray-Hart Multiple Carrier

weight of the drums serves to increase the tightness of the grip.

Manual handling of drums is almost entirely eliminated by use of the Drum Carrier; and damage to drums and injuries to workers can be reduced to negligibility. The carrier unit is easily interchangeable with standard forks; and installation requires only a few minutes with the use of ordinary tools. It is manufactured by Traynor-Reinhart, Oakland, Calif.

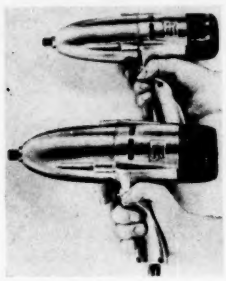
Portable Hydraulic Bender

THIS new lightweight, portable tool forms smooth, uniform pipe bending operations right on the job. Weight has been kept down to a minimum without loss of strength. The combined weight of the jack and frame is only 83 lbs. Removable hydraulic jack simplifies the service problem and can be used for many other useful purposes. Open jaw construction speeds up production. The 30 in. steel frame is electrically welded and heavily reinforced. Comes complete with ¾, 1, 1¼, 2 and 2½ in. dies. Catalog sheet available.

Showing operation and parts of portable tool used for bending pipe.

New Electric Impact Tool

A NEW and heavier model of the all-purpose electric impact tool is now announced by Ingersoll-Rand for maintenance and light production work in the air conditioning and refrigeration fields.



New Electric Impact Tool made by Ingersoll-Rand.

The new model will perform all the operations of its prototype, with extended capacity. With standard accessories it will run and remove nuts up to ⅝ in. thread size; drive and remove studs; extract broken cap screws and studs; apply and remove machine screws of all kinds; run wire brushes; drill brick, metal and masonry; tap; and ream. It may also be used for woodboring.

Known as the 8U, the new model has all the features and advantages that have made the 4U model so useful for light maintenance and production work. The reversible motor makes it as easy to remove screws, studs, and nuts as to apply them; the motor never burns out—even if the spindle stalls; the impact principle operates whenever resistance is met and provides extra power to push through the job. Virtually no torque reaction is transmitted back to the operator.

The new tool is 12⅛ in. in length and weighs 9 lbs., 13 oz. It is available for either 110 or 220 volt current and operates on AC or DC.

For further information write to Ingersoll-Rand Co., 11 Broadway, New York.

A Book You Should Have!

REFRIGERATION THEORY and APPLICATIONS

SECOND EDITION

THE AUTHOR H. G. Venemann, Professor of Refrigeration in the school of Mechanical Engineering, Purdue University.

WHETHER you **OPERATE** a plant, **SELL** refrigeration equipment, or are a **STUDENT** of refrigeration, this **NEW** book gives you the basic facts and principles involved in the processes of mechanical refrigeration. Now, more than ever before, today's conditions demand your thorough knowledge and understanding of these pertinent facts.

Too often "force of habit" methods make the experienced engineer lose sight of the knowledge that contributes so greatly to a thorough understanding of efficient plant operation.

Now, in this new book—just published—is included refrigeration **THEORY — PRACTICE — APPLICATIONS** — set down in easy-to-understand language for both the student and the engineer—practical information that will help you diagnose, correct conditions, operate and design an efficient installation

336 pages
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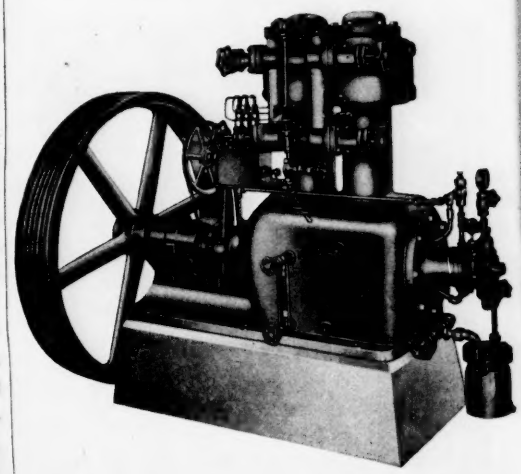
So goes the old nursery rhyme, and *now* is the "to make ready" time for the 1949 season.
STERLING is the "one for the money" to help you be ready for the "4 to go" next spring.
Check your compressors, condensers, coils, tanks, etc. and contact your nearest STERLING distributor for additions, replacements or repairs to your present refrigerating system, or a complete new plant—remember, more than 50 years of STERLING superiority are at your service.



REYNOLDS MANUFACTURING CO.
SPRINGFIELD · · · MISSOURI.

"Builders of Fine Refrigeration Equipment"

MANUFACTURERS' NEWS

Worthington Executives Talk to Distributors

AT TWO separate meetings recently, Worthington Pump and Machinery Corporation officials told distributors that air conditioning and refrigeration products have stepped from the luxury group to the essential.

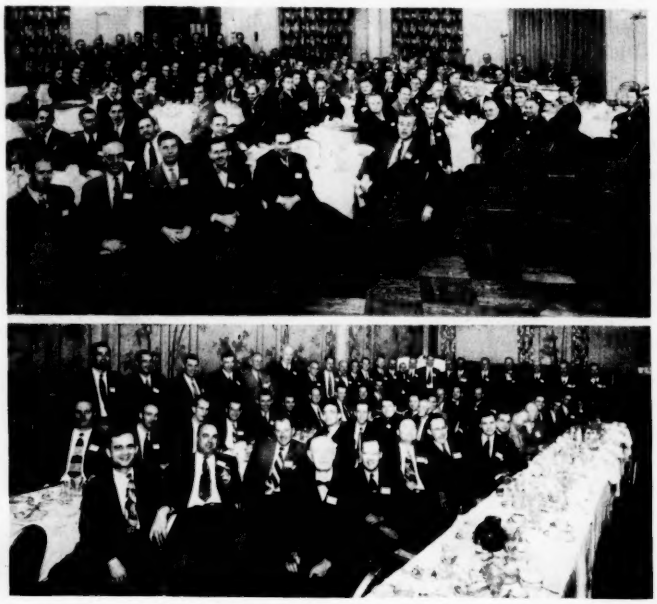
The first meeting was held at the Rice Hotel, Houston, Tex., November 15 and 16, and was attended by forty top men of twenty-one distributor organizations from the southern and southwestern states. The second meeting took place at the LaSalle Hotel, Chicago, November 18 and 19, with fifty representatives from thirty-one distributor organizations from the middle-western states.

In speaking of the future of the industry, M. M. Lawler, manager, Air-Conditioning and Refrigeration Division, Harrison, N. J., stated, "we have hardly scratched the surface of the applications and markets available. Thousands of chemical and pharmaceutical products must have controlled temperature and humidity conditions as they move through the various phases of manufacture and storage. Mining and metal working, autos and aircraft, paper-making and printing, transportation and communication, clothing, photographic materials, precision instruments and electronic equipment—are only a few of the broad industry classifications dependent, in varying degrees, on refrigeration and air-conditioning."

William F. Bishop, Assistant Manager in charge of air-conditioning and refrigeration distributor sales for the corporation, with headquarters at Holyoke, Mass., pointed to a four-hundred per cent increase since 1940. "The market for air-conditioning and refrigeration equipment", he said, "has expanded in leaps and bounds in the last five years. Employment in the industry has increased 63 per cent since 1937. Factory billings in 1940 were aproximately fifty million dollars. It is essential that factory billings for 1948 will be approximately 220 million dollars—an increase of over 400 per cent.

R. P. Lockett, Sr., vice-president, A. M. Lockett & Company, Ltd., addressed the Houston group; and at both meetings, in addition to Messrs. Lawler and Bishop, addressing the groups were C. E. Wilson, vice-president, W. D. Smith, commercial vice-president; F. J. Watt, assistant manager, general refrigeration, D. H. McCuaig, supervisor of engineering sales; Bruce T. LaPierre, assistant advertising manager; Philip H. Shaw, supervisor distributor sales; Eugene C. Hamilton, manager of distributor service; J. Neuhoff, chief engineer air conditioning and condensing units division; and W. O. Wilson, commercial vice-president of Worthington, the latter addressing the Chicago group.

A period was devoted at each meeting for a distributor open-forum discussion, where answers were given to technical and marketing questions.



Distributor Conferences of Worthington Pump & Machinery Corp. Above, Chicago meeting held November 18-19. Below, Houston meeting held November 15-16.

Edwards New Sales Manager for Schnacke

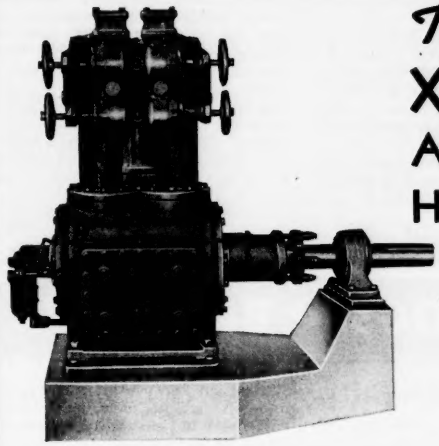
JOHN B. EDWARDS has been appointed to head the sales department of the Refrigeration Equipment Division of Schnacke, Inc., Evansville, Ind., as of December 1, 1948. Formerly of Beloit, Wis., Mr. Edwards was for many years sales manager of the Lipman Division of the Yates American Corporation. He has years of experience in both Freon and ammonia refrigeration equipment and is highly qualified in the merchandising and sales of the 5 to 50 hp. compressors and condensing units manufactured by Schnacke.

John B. Edwards

An aggressive sales program for 1949 which will be directed particularly to contractors and dealers is now being developed by Mr. Edwards. J. T. Thomas, formerly in this post, remains with the company, establishing himself in a southwest territory with headquarters in Texas.

DuPont Increases Price of Ammonia

AN INCREASE of one cent a pound in the price of anhydrous ammonia in cylinders for all areas, except the Pacific Coast is announced by Du Pont Co. The rise, it was said, is necessary because of the increases in rail freight rates. Ammonia is shipped to the Pacific Coast by steamship. The new price in Zone 1 is 17 cents a pound.



The NEW IMPROVED XL *HIGH SPEED* AMMONIA COMPRESSORS HAVE LONG LIFE *and* DEPENDABILITY

XL Ammonia compressors are equipped with roller bearings — ring plate valves — force feed lubrication for slow or high speed operation.

Made in sizes from 4x4 to 10x10—2 cylinders.

38 years manufacturing Ammonia compressors assures you of the best in modern designed machinery.

For full information and details, write or wire—

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Manufacturers of Freon and Ammonia Refrigerating and Ice Making Machinery, Ammonia Valves and Fittings.

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PITTSBURGH *Air Pressure Tested* COILS

Electrically welded, continuous; Air-Pressure-Tested while submerged in water. Built to your specifications. Send for new Coil Data Book and let us quote.

Welded Headers—Welded Ammonia Receivers
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Pittsburgh Pipe Coil & Bending Company
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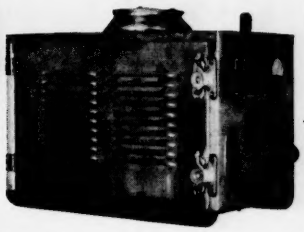
control odors and mold

USE GENERAL OZONE EQUIPMENT wherever eggs, vegetables, cheese, fruits, meats and fish are stored . . then watch food spoilage go down and profits go up.

Let General Ozone engineers solve your odor and mold problems. General Ozone has a complete line of modern ozonizing equipment plus full service facilities for both old and new types. Write us today for further information.



MODEL C-2
Approved by Underwriters' Laboratories, Inc.

GENERAL OZONE CORPORATION

7 West Sixtieth St., New York 23, N. Y. 1455 West Congress St., Chicago 7, Ill.

Manufacturers of ozone generating equipment for cold-storage • warehouses refrigerated cars • walk-in coolers • air recirculating systems • homes • garages • hospitals

Mathieson Purchases Ammonia Plant

J. C. Leppart, executive vice president of Mathieson Chemical Corp., (third from left), receives title to the Lake Charles ammonia plant from Hugh H. Brister, district director of the War Assets Administration, acting for the R.F.C. Looking on are J. F. Newell, manager of Mathieson's Lake Charles operations (extreme left), and A. T. Bennett, the company's vice-president-general manager of operations.

Finnegan Moves

THE W. J. Finnegan Company announces the removal of its offices and laboratory to 2121 Pasadena ave., Los Angeles, Calif., effective January 1, 1949.

York Petition Denied

THE litigation between York Corporation and Refrigeration Engineering, Inc., of Los Angeles, Calif., which has been pending in the various courts for several years is finally ended. York Corporation's attempt to have the Supreme Court of the United States review and reverse the decision of the Ninth Circuit Court of Appeal's decision upholding the validity of the Refrigeration Engineering, Inc., Mc Adam patent ended when the Supreme Court of the United States denied York's petition for writ of certiorari. Their rejection to review the case was handed down on November 8. The decision of the Ninth Circuit Court of Appeals upholding the validity and finding of infringement by York Corporation is thus final.

CATALOGS AND BULLETINS

Water Demineralizing Explained

A WELL-illustrated catalog on Filt-R-Stil water demineralizers has been published by the American Cyanamid Co. The equipment described is utilized to remove minerals from water supplies and produce water which is equivalent to distilled. No heat or fuel is required because it is a chemical operation and the manufacturers point out that cost of water thus produced is only a fraction of that of distilled water. The design and operation of the demineralizing equipment is completely described in simple non-technical terms. The chemical reactions are shown in understandable diagrams.

Photos and explanatory drawings illustrate the different models of the equipment which have a capacity of from 60 to 1,000 gallons of water per hour. Specifications and cost of operation data are given, along with information about application of the equipment to ice plants and other industrial uses. Of special interest to ice plants is the elimination of core pulling when the demineralized water is used in the cans.

Copies of the booklet are available from the American Cyanamid Co., Ion Exchange Products Dept., 30 Rockefeller Plaza, New York 20, N. Y. Request information on Filt-R-Stil demineralizers.

Vibration Absorbers

A FOUR page bulletin has been issued by Packless Metal Products Corp. of New Rochelle, N. Y. on packless vibration absorbers. These absorbers are made for use wherever vibration and noise is developed from pulsating pressure on gas or liquids. The bulletin gives description, application data and operating specifications.

U. P. Issues Memo on Rate Increase

A MEMORANDUM in booklet form has been prepared by the Union Pacific Railroad Co., listing increased rates and charges as published in Tariff of Increased Rates and Charges, No. X-162-A and No. X-166-B. Of particular interest is a map of the United States showing boundary lines of various increase territories. A copy may be obtained from the freight traffic department of the Union Pacific, 15th and Dodge Sts., Omaha, Nebr.

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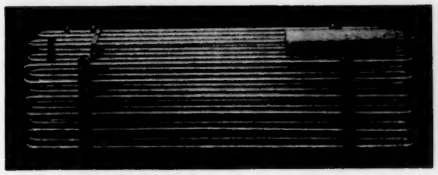

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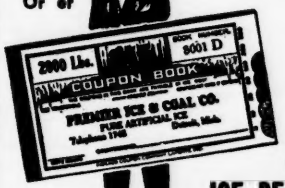

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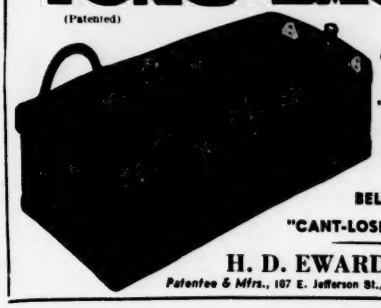

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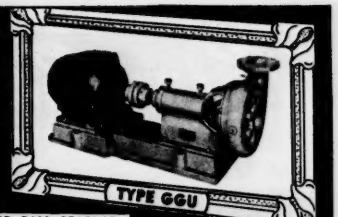

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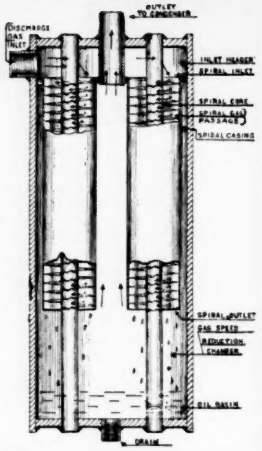

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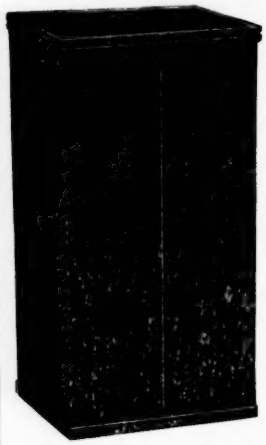

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Pittsburgh Waterproof Co., Pittsburgh, Pa.
Union Bag & Paper Corp., New York, N. Y.
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Gifford-Wood Co., Hudson, N. Y.
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Frick Company, Waynesboro, Pa.
Howe Ice Machine Co., Chicago, Ill.
Kehoe Machinery Co., Inc., R. P., New York, N. Y.
Martocello & Co., Jos. A., Philadelphia, Pa.
Pace Brothers, Los Angeles, Calif.
Refrigeration Engineering Corp., Philadelphia, Pa.
Reynolds Mfg. Co., Springfield, Mo.
Vilter Mfg. Co., Milwaukee, Wis.
Vogt Machine Co., Henry, Louisville, Ky.
Worthington Pump and Machinery Corp., Harrison, N. J.

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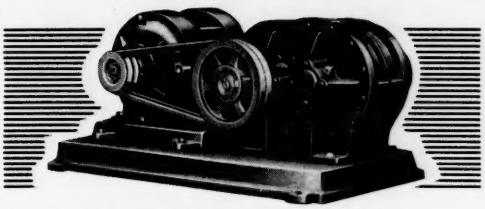

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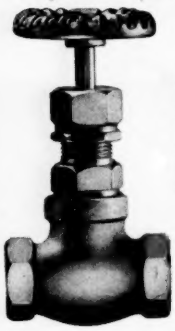

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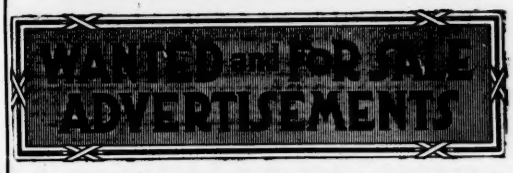

All classified advertisements are payable in advance. Except for Positions and Help Wanted classifications, this section is reserved exclusively for the purchase and sale of USED equipment, existing and used plants, and surplus material. Rates: $3.50 for 50 words or less; 60c for each additional 10 words or fraction thereof; 75c per line for bold face headings; $9.00 per inch for ads all set in bold face type or listing items on separate lines.

POSITIONS AND HELP WANTED

WANTED—Chief engineer for 80 ton electrically driven plant located in Indianapolis. Please advise salary wanted and give references. Irvington Ice & Coal Co., 400 S. Ritter Ave., Indianapolis 19, Ind.

WAREHOUSE EXECUTIVE—with thorough experience in refrigerated and general merchandising warehousing, now employed as manager of warehouse, is interested in relocating. Age 48, good health, habits and excellent references. Address Box JA-12, Ice and Refrigeration, 435 N. Waller Ave., Chicago 44, Ill.

POSITION WANTED—As chief engineer of ice and refrigeration. Applicant has thirty years practical experience with technical training, familiar with all standard equipment including steam, electric and Diesel power, low temperature, quick freezing, etc. Will go anywhere. Address Box JA-16, Ice and Refrigeration, 435 N. Waller Ave., Chicago 44, Ill.

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ICE PIANTS—*Wanted and For Sale—Cont.*

FOR LEASE—Electric driven, raw water ice plant in town of 25,000 in Northeastern Ohio. EXCELLENT opportunity to right person. Inquire George P. Samman, 1509 Williamson Building, Cleveland 14, Ohio.

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COMPLETE ICE PLANT

To be moved from leased ground.
1—Practically new 8x8 high speed Frick compressor.
1—New 6x6 Sterling compressor.
2—100 h.p. natural gas caterpillar engines.
2—Generators.
1—Perfection ice scoring machine.
1—Air blower.
2—Good cypress cooling towers.
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Write or call W. A. Dumas, Box 450, El Dorado, Arkansas, Phone 2600.

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A plant ordered two years ago now ready for delivery. Location plans changed so desire to sell it. It is a new 15 ton electrically driven raw water ice plant complete. Modern in every respect. Can ship from manufacturer immediately. Has automatic controls, 4 can grid system, storage coils, trunk type tank coils with float control and scoring machine. It can be increased to 20 tons by adding another compressor. If interested in buying the plant, write "The Man with the Extra Ice Plant," Box JA-5, Ice and Refrigeration, 435 N. Waller Ave., Chicago 44, Ill.

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Fairbanks-Morse Diesel Electric, whole or part. Good condition.

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WANTED—300 lb. Uline ice scoring machine in good condition. Pottsville Ice Co., E. Railroad St., Pottsville, Penna.

FOR SALE—3 - 10x10 York ammonia compressors, 225 r.p.m. with oil pot. C. Hoffberger Company, 1517 Gay St., Baltimore 13, Maryland.

FOR SALE—One 7x7 Frick ammonia compressor. 182 r.p.m. In operation. Superior Ice Inc., 904 New Boston Road, Texarakana, U.S.A.

FOR SALE—12x12 Frick ammonia compressor direct connected to electric machinery, 100 h.p. synchronous 3 phase, 60 cycle, 2300 volt AC motor, complete with panel board and exciter. Danville Ice Co., Inc., Danville, Virginia.

WANTED—Good used F&E hand operated cubing machine or Hanson electric cuber. In replying, give price, condition and reason for selling. Monroe City Ice Co., 404 E. Sumner St., Monroe City, Missouri.

FOR SALE—3x3 twin Frick and 4x4 York self-contained units. 3x3, 4x4, 5x5, 6x6 and 7½x7½ medium speed York and Frick compressors with motors and V belts. Five 1¼" Alco magnetic valves. Write E. Niebling, 1318 St. Clair Ave., Mt. Healthy, Cincinnati 31, Ohio.

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1—One Flynn & Emmerich 300-S model automatic ice cuber, less than 100 tons of ice cubed—like new—cubes full 300 lb. cake automatically, $3,000 F.O.B.
2—One Lilly Precision Ice Breaker—type 12 C.E. Complete with chain elevator, three sizing bins holding 2500 lbs. of sized ice each—delivery chutes 31" above floor for quick bag filling—screens (1¼" or ½") (1¼" over-run. Overall dimensions of unit 10'0" high, 17 ft. long, 5'0" wide. Excellent condition ..... $2,200 F.O.B.
3—One Garwood car icing body (6 ton) hydraulic lift $1,500
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1—Accumulator including all valves and float for a 20 ton freezing tank.
1—3 cyl. General Motors Diesel engine, rated 56 h.p., operated 2 years.
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1—6 h.p. Witte Diesel engine V belted to 5 KW alternator 220 volt, 3 phase, 6 cycle, direct connected to exciter.
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1—12000 Gallon fuel storage tank ¼" steel.
1—12 h.p. Lister Blackstone engine V belted to 9 KVA 220 volt, 3 phase, 60 cycle alternator with direct connected exciter (Diesel).
All spare parts for 150 h.p. G-4 Cooper-Bessemer Diesel engine.
1—3 h.p. vertical agitator.
All the above equipment in first class running condition for sale for the reason that we have converted to electrical power, and have increased the size of the freezing tank.

SUBURBAN ICE COMPANY
P.O. Box 366 Vicksburg, Mississippi

USED MACHINERY—*Wanted and For Sale—Cont.*

WANTED—In the market for any good used refrigerating and ice making equipment you may have for sale. Address Box DC-19, Ice and Refrigeration, 435 N. Waller Ave., Chicago 44, Ill.

FOR SALE—Kohlenberger 7½"x7½" 4 cylinder unit with controls, 100 h.p. motor, starter, oil trap. Shell-tube condenser, 45-1"x18' tubes. Ammonia receiver 18"x16'. Shell tube brine cooler, 42"x14'. 209-2" tubes, 1550 sq. ft. Float control. Pipe. Pumps. All in brand-new condition. Burton Haggard, 4736 Stuart St., Denver, Colo.

FOR SALE—1 York 5x5 self-contained unit, complete; 1 Automatic 6x6; York 9x9 with motor; York 1 ton flake ice unit; 150 ton DeLaVergne with Skinner Uniflow steam engine, 10x10 crank shafts, piston and flywheel. 1 each 150 and 180 h.p. Fairbanks-Morse Diesels; 1 each 40 and 60 KVA Fairbanks-Morse generators. 12,000-gallon fuel tank; freezer doors; 1¼"x5" weld ends return bends, coils, fittings, motors. 90 KW Erie-Ball generator unit, complete. Parke Pettegrew & Son Co., 370 W. Broad St., Columbus 8, Ohio.

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York 8x8, 2 cylinder, Serial No. 7976, with 40 h.p., 685 r.p.m., Westinghouse AC motor. Excellent condition. Completely overhauled and ready for immediate shipment. Priced to sell.

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Rebuilt and guaranteed ammonia condensing units with retubed condensers; units repainted and like new.

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Frick 4x4, double cylinder units, 7½ h.p.	@	800.00
York 6x6, double cylinder units, 20 h.p.	@	1500.00
Frick 5x5, double cylinder compressors	@	700.00
York 6½x6½, double cylinder compressors	@	800.00

New Baker ammonia compressors in stock, all sizes.

CONNECTICUT ICE MACHINE CO., INC.
South Norwalk, Conn.

FOR SALE—USED ICE PLANTS & EQUIPMENT

1—70 ton Frick ice plant—electric driven.
1—30 ton York ice plant—electric driven.
1—20 ton York ice plant—electric driven.
1—10 ton York ice plant—electric driven.
2—10x10 Yorks, 250 r.p.m.
1—10x10 York, 360 r.p.m.
1—8x8 York high speed compressor, 360 r.p.m.
1—8x8 York, 185 r.p.m.
1—6x6 York, 185 r.p.m.
1—6x6 York, 360 r.p.m.
1—6x6 Frick, 277 r.p.m.
1—5x5 Frick—277 r.p.m.
1—5x5 York self-contained unit.
2—4x4 York self-contained units.
2—3x3 York self-contained units.
2—Discharge valves from 10x10 Frick compressor, high speed.
Vertical, horizontal and double pipe condensers of all sizes. Brine coolers of all sizes. 4000' of 1¼" black steel ammonia pipe. Brine pumps, valves, fittings, electric motors and misc. equipment. All equipment rebuilt and guaranteed. Send us your requirements.

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Large Ice Plant

3 Ingersoll-Rand compressors, 50, 90 and 100 tons, direct connected to sychronous motors. 1 York 6½x6½ high speed compressor. I York 6½x6½ slow speed compressor. 500 ice cans, 300-lb. Large quantity of ammonia pipe with return bends. Electric cranes, pumps, valves, fittings, and high pressure boilers.

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FOR SALE—USED ICE PLANTS AND EQUIPMENT

1—30 ton York ice plant electric driven, herringbone coils, 4 can group.
1—10x10 York ammonia compressor high speed.
1—6½x6½ two cylinder York high speed ammonia compressor.
1—6x6 two cylinder Frick ammonia compressor medium speed.
1—6x6 two cylinder Voss high speed ammonia compressor.
1—5x5 two cylinder York high speed ammonia compressor.
1—4x4 two cylinder York high speed ammonia compressor.
1—4x4 two cylinder Frick ammonia compressor, NEW.
1—3x3 two cylinder Frick unit, high speed.
1—3x3 one cylinder York unit, high speed.
York shell and tube condenser 28" dia. x 16' L, 51—2" tubes.
1—size 1534 Kroy air cooling unit, floor type, direct connected to ½ h.p. motor.
1—25" dia. x 10'0" long 3 pass enclosed type ammonia condenser.
3—16" dia. x 10'0" long 6 pass enclose type ammonia condenser.
3—Perfection ice scoring machines 300# to 400# blocks.
1—Hill Automatic Gas Purger.
All makes and types recording thermometers, shell and tube double pipe condensers (send us your requirements). Brine coolers, double pipe 2" and 2" horizontal brine coolers, submerged shell and tube type. 1¼" and 2" ammonia coils, approximately 6,000'. Electric motors, starters and panel boards, all sizes. Ice cans, agitators, cranes, pumps, low pressure blowers, valves and fittings. Send us your requirements on any equipment you may need.

ENTERPRISE EQUIPMENT CORPORATION
Phone: Yonkers 8-8118-9 77 Alexander St., Yonkers, N. Y.

The ROBERT P. KEHOE MACHINERY CO., Inc.

WANTS TO TAKE THIS OPPORTUNITY TO EXTEND TO ALL OF ITS CUSTOMERS ALL OVER THE WORLD

A Very Happy and Prosperous New Year

AT THIS TIME WE WISH TO ANNOUNCE OUR NEW POLICY:

Starting January 1, 1949—All our used Ammonia Compressors will be guaranteed for 90 days against defective working parts. Also, all used Ammonia Condensers and Brine Coolers will be guaranteed, re-tubed and tested before shipment is made.

Our present stock on hand includes over 60 compressors ranging in size from 3x3 to 17x18; Ice plants from 8 to 50 tons capacity, and a large supply of Ammonia Valves, Fittings, and Cold Storage Doors, etc., etc. — All for immediate delivery.

Now, after having served the Refrigeration Industry and its Dealers for over 25 years, we feel sure that this new undertaking will please all of our family of SATISFIED CUSTOMERS.

NEW EQUIPMENT FOR IMMEDIATE DELIVERY

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Compressors With or Without Motors	
6 x 6—350 R.P.M.—V Belt-Wheel	1001
5 x 5—360 R.P.M.—V Belt-Wheel	1002
8 x 8—400 R.P.M.—V Belt-Wheel	1003
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Ammonia Condensers	
4—12¾ x 12 Horizontal—36—1¼" tubes	1020
2—30 x 14 Vertical 109—2" tubes	1021
1—16" x 10" x 10' Shell and Tube Condenser, 60 1¼" tubes	1022
Evaporative Condensers	
20-40-50 ton condensers	1030
Ice Cans	
50—100 lb. cans—15½" x 8" x 31"	1041
40—50 lb. cans—6" x 12" x 26"	1042
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½" to 2"—Screwed Globe Valves	1051
1" to 6"—Square Flanged Globe Valves	1052
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All Sizes.	
Ice Crushers	
Gas and Electric Driven	1070
Ice Cubers	
1—100 lb. Uline Automatic Cuber	
Cold Storage Doors	
Receivers and Oil Separators	
All sizes	1080

Brand new 2 hp. and 3 hp. vertical agitators.

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You too will say so after installing

J. H. H. VOSS VALVES
REG. U.S. PAT. OFF.

in your compressors

This letter tells why

Blue Boy DAIRY

June 11, 1946

J. H. H. Voss Co., Inc.
785 East 144th Street
New York 54, New York

Gentlemen:

We have installed the new Voss valves in our 9x9 Jurick compressor. These valves are functioning perfectly. We feel we are getting about a 20% increase in capacity on this machine, plus a much better running machine with considerably less noise. They are wonderful. This all being done without any increase in R.P.M.

In closing, we wish to compliment you on the expert workmanship. We are most pleased.

Very truly yours,
BLUE BOY DAIRY, INC.
F. Schroeder
Supt.

FS:LB

VOSS VALVES give long "trouble-free" service—improve efficiency—cut power cost—and increase capacity.

Tell us about your compressor problems—let us submit sketches and estimates.

DESIGNED BY ENGINEERS MADE BY CRAFTSMEN

J. H. H. VOSS CO., Inc.

785 East 144th Street NEW YORK 54, N. Y.

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How asphalt makes or breaks an insulation job

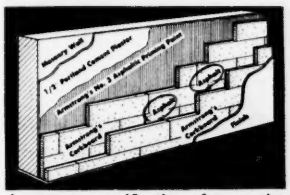
Workman for Armstrong's Contract Service dipping corkboard insulation in Armstrong's Erection Asphalt automatically held between 350° and 375° F.

THE kind of asphalt used and the way it's handled can make or break your insulation job. Asphalt does two vital things. It holds the insulation firmly in place, and it seals out air and moisture. The use of a poor asphalt, or the improper handling of asphalt on the job, can allow the insulation to loosen or the vapor seal to fail.

That's why Armstrong has devoted years of research to this phase of its insulation contract service. The kind of asphalt Armstrong workmen use, and the way they use it, add greatly to the performance of every Armstrong low-temperature job.

1. Material. Armstrong's Erection Asphalt has been developed to strict specifications. Exactly the right melting point, flash point, volatility, and solubility are assured. This odorless asphalt has been oxidized in refining to make it extra tough and chemically stable.

2. Handling. Asphalt must be heated to just the right temperature if it is to bond firmly. Armstrong workmen are equipped with thermostatically controlled tanks to hold dipping temperatures steady.



Armstrong specifications for erection of board-type insulations call for proper use of hot asphalt, a vital part of every well-applied insulation job.

3. Application. When applying insulation, Armstrong mechanics set their equipment near the work in progress to make sure the asphalt stays hot on the dipped insulation board and bonds it securely to the wall.

In mopping asphalt on floors, they cover only small areas at one time to avoid overcooling before insulation is applied.

If you plan to build or enlarge any low-temperature space, it will pay you to get full information on Armstrong's Complete Contract Service. It offers you expert engineering advice, top-quality materials, and workmen who know how to handle them properly. Write to Armstrong Cork Company, Industrial Insulation Department, 4501 Concord Street, Lancaster, Pa.

ARMSTRONG'S INDUSTRIAL INSULATION

Complete Contract Service
For All Temperatures

From 300° Below Zero

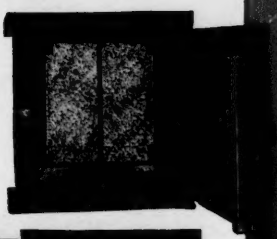
To 2800° Fahrenheit

You can cut

REFRIGERATION COSTS

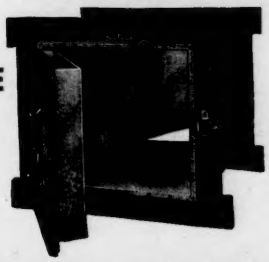
When Handling

CANS, CRATES, KEGS



CAN AND CRATE PASSING DOOR

The Auto Close doors swing open readily and close automatically when the cold storage doors open. This checks the inrush of warm air and saves refrigeration. The door can be fitted into a conveyor system or used with its own roller conveyor.



ICE CREAM CAN PASSING VESTIBULE

The vestibule is equipped with a cold storage door at each end. Maximum loss of cold air is limited to the volume of the vestibule because either door is always closed whether loading or unloading. Vestibule holds six to nine cans in various arrangements.

KEG PASSING DOOR

A flexible light weight insulating curtain of moulded material prevents the loss of cold air when the door is open. The movement of the keg lifts the curtain without shock or abrasion as it passes. It immediately drops back in place and air movement is cut off.

These Jamison-Built Doors permit the speedy passing of cans, crates, boxes, packages or kegs in and out of the refrigerated space. Each of the methods illustrated is particularly well suited to the temperatures and type of container. The loss of cold air and the entry of warm air during the time containers are moved in and out of refrigerated storage rooms is held to a minimum. The resulting savings in refrigeration costs can be substantial.

JAMISON

HAGERSTOWN, MARYLAND, U. S. A.

Standard types of Jamison-Built doors are available for a wide range of temperatures and applications. For special requirements doors can be built to your specification regardless of size, character or duty.

Write for new catalog that gives helpful information on cold storage door selection.

Jamison Cold Storage Door Co., Hagerstown, Maryland

The Oldest and Largest Builder of Cold Storage Doors in the World